AD-A074 709 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/2
NATIONAL DAM SAFETY PROGRAM. BATAVIA KILL WATERSHED PROJECT DAM--ETC(U)
JUN 79 G KOCH DACW51-79-C-0001

UNCLASSIFIED NL

1 OF 1
AD
A074 709

END
DATE FILMED
11-79
DDC

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER	2. GOVT ACCESSION NO. / 3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Phase I Inspection Report Batavia Kill Watershed Project Dam No. 4A Mohawk River Basin, Greene County, New York Inventory No. N.Y. 570	5. TYPE OF REPORT & PERIOD COVERED Phase I Inspection Report National Dam Safety Program 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) George Koch, P.E.	8. CONTRACT OR GRANT NUMBER(s) DACW-51-79-C-0001
9. PERFORMING ORGANIZATION NAME AND ADDRESS New York State Department of Environmental Conservation/ 50 Wolf Road Albany, New York 12233	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 12 80
11. CONTROLLING OFFICE NAME AND ADDRESS New York State Department of Environmental Conservation/ 50 Wolf Road Albany, New York 12233	12. REPORT DATE 22 June 1979 13. NUMBER OF PAGES
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Department of the Army 26 Federal Plaza/ New York District, CofE New York, New York 10007	15. SECURITY CLASS. (of this report) UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; Distribution unlimited.

LEVEL II

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

National Dam Safety Program. Batavia Kill Watershed Project Dam Number 4A (Inventory Number N.Y.-570), Mohawk River Basin, Greene County, New York. Phase I Inspection Report.

DDC RECEIVED OCT 5 1979

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Dam Safety
National Dam Safety Program
Visual Inspection
Hydrology, Structural Stability
Batavia Kill Watershed
Greene County
Batavia Kill

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

Batavia Kill Watershed Project Dam No. 4A was found to have no deficiencies which would render the dam unsafe.

393 970

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

AD A074709

DDC FILE COPY

DAM NO. 44
GREENE COUNTY, NEW YORK
INVENTORY NO. NY 570

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION UNLIMITED

CONTRACT NO. DACW-51-79-C0001

NEW YORK DISTRICT CORPS OF ENGINEERS

DISCLAIMER NOTICE

THIS DOCUMENT IS BEST QUALITY PRACTICABLE. THE COPY FURNISHED TO DDC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probably Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
BATAVIA KILL WATERSHED PROJECT
DAM No. 4A
I.D. No. NY 570
(#191C-3681)
MOHAWK RIVER BASIN
GREENE COUNTY, NEW YORK

TABLE OF CONTENTS

PHASE 1 REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Batavia Kill Watershed Project Dam No. 4A I.D. No. NY-570 (#191C-3681)
State Located:	New York
County Located:	Greene
Watershed:	Mohawk River Basin
Stream:	Batavia Kill (a tributary to the Schoharie Creek)
Date of Inspection:	November 21, 1978

ASSESSMENT

The Batavia Kill Watershed Project Dam No. 4A is a floodwater retarding structure. Examination of available documents and a visual inspection of the dam did not reveal conditions which are considered to be unsafe.

The total discharge capability of the spillways is adequate for the Probable Maximum Flood (PMF).

To assure the continued satisfactory performance of this structure, a schedule of periodic maintenance should be established. Included in this schedule should be items such as mowing the grass on the embankment slopes and periodic operation and lubrication of the slide gate mechanism.

George Koch

George Koch
Chief, Dam Safety Section
New York State Department
of Environmental Conservation
NY License No. 45937

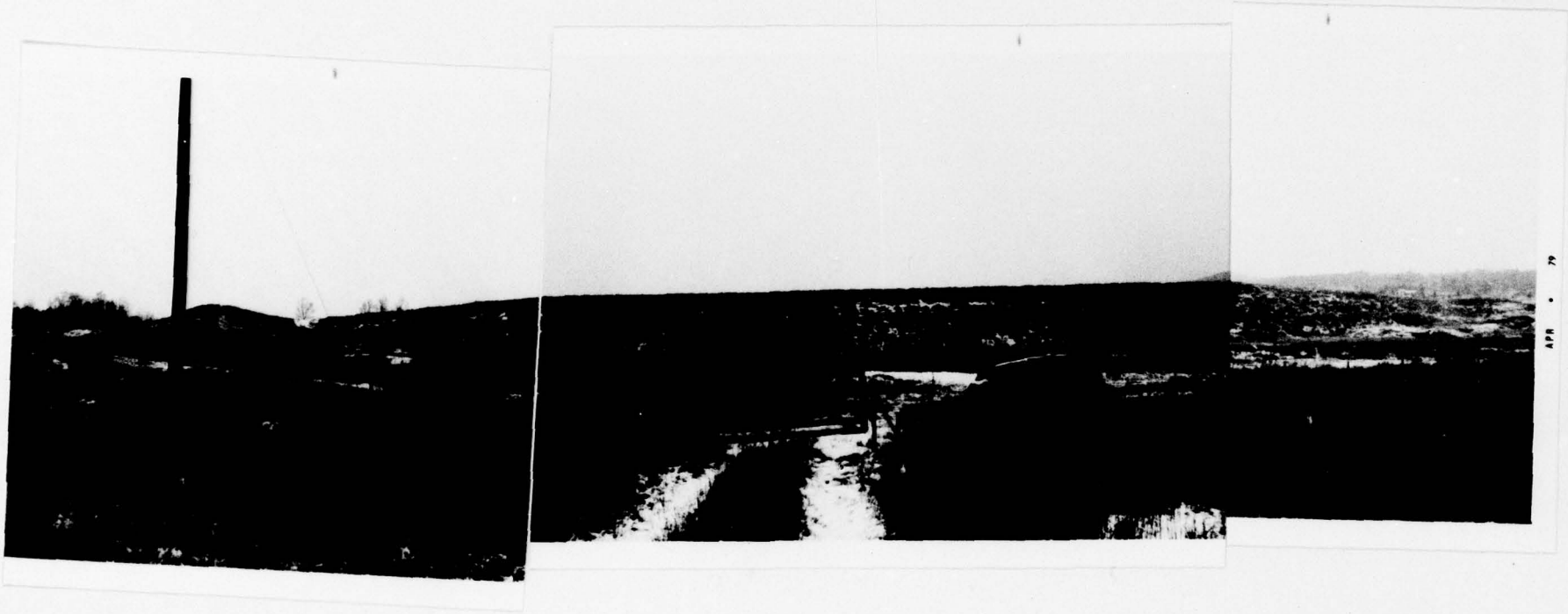
Approved By:

Clark H. Benn

Col. Clark H. Benn
New York District Engineer

Date:

22 June 79



Overview - Downstream Face

Batavia Kill Watershed Project Dam No. 4A

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
BATAVIA KILL WATERSHED PROJECT
DAM No. 4A
I.D. No. NY 570
(#191C-3681)
MOHAWK RIVER BASIN
GREENE COUNTY, NEW YORK

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase 1 Inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367.

b. Purpose of Inspection

This inspection was conducted to evaluate the existing conditions of the dam, to identify deficiencies and hazardous conditions, to determine if these deficiencies constitute hazards to life and property, and to recommend remedial measures where required.

1.2 DESCRIPTION OF PROJECT

a. Description of the Dam

The Batavia Kill Watershed Project (BKWP) Dam No. 4A consists of an earth dam with a principal spillway pipe passing through the embankment and an emergency spillway on either end of the dam.

The dam consists of a zoned compacted earth embankment which is 57 feet high, has a crest length of 1320 feet and a crest width of 18 feet. The upstream slope is 1 vertical on 3 horizontal and the downstream slope is 1 vertical on 2 1/2 horizontal. The crest and exposed slopes are grass covered. An earth cutoff trench of varying depth and width keys the embankment into the foundation soils.

The principal spillway consists of a rectangular reinforced concrete drop inlet structure, a 42 inch diameter reinforced concrete pressure pipe with anti-seepage collars and a plunge pool to dissipate energy at the outlet end of the conduit. A reservoir drain consisting of an 18 inch cast iron pipe extends from the upstream toe of the embankment to the base of the principal spillway riser. A vertical slide gate mechanism mounted along the inside of the riser controls the flow through the reservoir drain. The western emergency spillway is in a rock cut and has a base width of 55 feet. The eastern emergency spillway is 200 feet wide and is located in an earth cut.

An internal drainage system consisting of a gravel and sand filter with perforated 10 inch diameter corrugated metal collector pipes is located at the base of the embankment near the downstream toe. Seepage is collected and conducted through this drain and outleted into the plunge pool.

b. Location

BKWP Dam No. 4A is located on the Batavia Kill, a tributary to the Schoharie Creek, approximately 1.5 miles north of the Village of Windham along Siam Road. The dam is in the Town of Windham, New York.

c. Size Classification

The dam is 57 feet high and is classified as an intermediate size dam (between 40 and 100 feet high).

d. Hazard Classification

The dam is classified in the "high" hazard category due to the presence of seven homes immediately downstream of the dam and several hundred homes in the Village of Windham which are within 2 miles of the dam.

e. Ownership

This dam is owned by the Batavia Kill Watershed District of Windham, New York.

f. Purpose of Dam

The dam is a floodwater retarding structure.

g. Design and Construction History

This dam was designed by the U.S. Department of Agriculture, Soil Conservation Service (SCS). Construction of the dam commenced in 1967 and was completed in 1970. The dam was built by Pin Oak Construction, Inc. The SCS office in Albany, has a design folder containing hydrologic, hydraulic and structural design information, in additionto the as-built contract plans and documents.

h. Normal Operating Procedures

Water flows over the principal spillway. This structure has sufficient capacity to discharge a 100 year flood without flow occurring in the emergency spillways. For storms greater than the 100 year flood, flows will discharge throughthe two emergency spillways.

1.3 PERTINENT DATA

a. Drainage Area (acres)	4352
b. Discharge at Dam (cfs)	
Principal Spillway @ Maximum High Water	272
Principal Spillway @ Emergency Spillway Crest Elevation	240
Emergency Spillways (Combined) @ Maximum High Water	29,988
Reservoir Drain @ Principal Spillway Crest Elevation	32
Maximum Known Flood	196
c. Elevation (USGS Datum)	
Top of Dam	1757.4
Emergency Spillway Crest (Aux. Spillways) West	1745.20
East	1747.7
Principal Spillway Crest (Service Spillway)	1713.00
Invert of Reservoir Drain Inlet	1703.75
d. Reservoir (Acres)	
Surface Area at Top of Dam	137
Surface Area at Crest of Emergency Spillway	98
Surface Area at Crest of Principal Spillway	10

e. Storage Capacity (acre-feet)

Top of Dam	2928
Emergency Spillway Crest	1509
Principal Spillway Crest	43

f. Dam

Embankment Type:	A two-zoned compacted earth fill with an earth keyed cutoff trench.	
Embankment length (ft)		1320
Slopes (V : H)	Upstream	1 on 3
	Downstream	1 on 2.5
Crest elevation (USGS Datum)		1757.4
Crest Width (ft)		18

g. Spillway

Principal Spillway (Service):

Type:	Uncontrolled, reinforced concrete drop inlet (3.5 x 10.5 ft.) rising 10 feet; 42 inch reinforced concrete pressure conduit 326 feet long; riprapped plunge pool.	
Length (ft.) Weir		26

Emergency Spillway (Auxiliary):

Type:	Two channels; one grass lined, the other in a rock cut, both having trapezoidal cross sections	
Bottom Width (ft.)	West	55
	East	200
Side Slopes (V : H)	West	1:3
	East	1:2.5 & 1:3
Length of level section (in profile) (ft.)		
	West	100
	East	50
Exit Slope (V : H)	West	1:48
	East	1:40

h. Reservoir Drain

Type:	18 inch diameter cast iron pipe with a reinforced concrete inlet.
Control:	Mechanically-operated vertical slide gate mounted along the inside of the principal spillway riser.

SECTION 2: ENGINEERING DATA

2.1 DESIGN

a. Geology

BKWP Dam No. 4A is located in the "Appalachian Uplands" physiographic province of New York State. These uplands are the northern extreme of the Appalachian Plateau and were formed by dissection of the uplifted but flat-lying sandstones and shales of the Middle and Upper Devonian Catskill Delta (395 to 345 million years ago). Relief is high to moderate. Maximum dissection occurs in the Catskill Mountain area where only the mountain peaks approximate the original plateau surface. The present surficial soil deposits have resulted primarily from glaciations during the Cenozoic Era (most recent 65 million year period), the last of which was the Wisconsin glaciation approximately 11,000 years ago. These soils were deposited, in general, directly by glacial ice and are composed of unstratified rock fragments of all sizes ranging from boulders to clay particles.

b. Subsurface Investigations

A subsurface investigation program was conducted by the Soil Conservation Service in 1966. This program consisted of 35 drill holes and 36 test pits. Applicable subsurface information has been included in Appendix G.

In general, the surficial soils at the project site consist of a heterogeneous mixture of glacial tills. The soils in the floodplain are primarily silty gravels and silty sands. There are occasional boulders in this soil matrix and bedrock was encountered at an elevation of 1655 (approximately 50 feet below the surface). The soils on both banks, in the vicinity of the emergency spillways were predominantly the same as those in the floodplain. There were more boulders in this soil however, and bedrock was encountered at elevation 1760 in the explorations for the western emergency spillway.

c. Embankment

The dam was designed by the Soil Conservation Service, who prepared a design report. Twenty-five drawings, several of which have been included in Appendix G, were prepared for the construction of the dam.

2.2 CONSTRUCTION RECORDS

Complete as-built contract plans and documents are available from the SCS office in Albany. Selected sheets from these as-built plans have been included in the appendix of this report.

2.3 OPERATION RECORD

Since the dam is an uncontrolled, floodwater retarding structure, no operating records are maintained regarding water levels. However during periods of heavy rainfall, SCS personnel do monitor reservoir levels.

2.4 EVALUATION OF DATA

The data presented in this report has been compiled from information obtained from the Soil Conservation Service as well as the New York State Department of Environmental Conservation files. It appears to be adequate and reliable for the purpose of the Phase 1 inspection.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspection of the BKWP Dam No. 4A was conducted on November 21, 1978. It was snowing lightly during the inspection and the temperature was about 25° F. The water surface at the time of the inspection was several inches above the crest of the prinicpal spillway. There was a slight flow from the principal spillway pipe spilling into the plunge pool.

b. Embankment

The earth embankment showed no signs of distress. The vertical and horizontal alignment of the crest appears to be as it was constructed with no visible surface cracks appearing on the crest or embankment slopes. There were no areas of sloughing or subsidence noted.

Inspection of the downstream face did not reveal any signs of seepage. At the time of the inspection, there was no discharge from the collection pipes of the internal drainage system. No undesirable vegetative growth or animal penetrations into the slopes were observed.

c. Principal Spillway

The principal spillway pipe, the riser and the plunge pool were all in satisfactory condition.

d. Emergency Spillway

The two emergency spillways were in satisfactory condition. One spillway is in a rock cut,but has a grassed bottom. The other spillway is in an earth cut.

e. Downstream Channel

The outlet channel was in satisfactory condition, with no severe side slope erosion or debris obstructions in evidence. The section of channel nearest the plunge pool had been overexcavated and backfilled with rock. During periods of low flow in the channel, this results in the water disappearing in this section and re-appearing further downstream.

f. Reservoir

There were no signs of soil instability in the reservoir area.

3.2 EVALUATION OF OBSERVATIONS

Visual observations did not reveal any problems which would adversely affect the safety of the dam.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

The normal water surface elevation is at the crest of the principal spillway. Downstream flows are limited by the capacity of the 42 inch diameter reinforced concrete pipe. The reservoir provides 1466 acre-feet of storage between the crest of the principal spillway and the crest of the emergency spillway.

4.2 MAINTENANCE OF DAM

The dam is maintained in satisfactory condition by the owner.

4.3 WARNING SYSTEM IN EFFECT

No apparent warning system is in effect.

4.4 EVALUATION

The dam is satisfactorily maintained.

SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

Delineation of the watershed draining into the reservoir pool area was made using the USGS 7.5 minute quadrangles for Hensonville, Livinstonville, Ashland and Durham, N.Y. The watershed consists of open grassed fields and woodlands situated in a rural area. Relief ranges from moderate to steep with the steeper slopes occurring in the upper reaches of the watershed. The shape of the watershed is generally rectangular with the dam located on the short dimension of the rectangle.

5.2 ANALYSIS CRITERIA

The analysis of the floodwater retarding capability of this dam was performed using the Corps of Engineer's HEC-1 (Dam Break version) computer program, incorporating the "Snyder Synthetic Unit Hydrograph" method and the "Modified Puls" flood routing procedure. The spillway design flood selected for analysis was the PMF in accordance with recommended guidelines of the U.S. Army Corps of Engineers.

5.3 SPILLWAY CAPACITY

The principal and emergency spillways are uncontrolled structures. The principal spillway operates under weir or orifice flow conditions depending on the floodwater inflow to the reservoir pool. During orifice flow operation, pressure flow develops in the 42 inch conduit. The emergency spillway was analyzed as a broad-crested weir having a discharge coefficient (C) of 3.087.

The spillways have sufficient storage capacity for discharging the peak outflow from the PMF. For this storm, the peak inflow is 12,054 cfs and the peak outflow is 11,529 cfs. When the spillways are discharging the peak outflow, the water surface will be 5' feet below the top of the dam.

5.4 RESERVOIR CAPACITY

Normal flood control storage capacity of the reservoir between the principal and the emergency spillways is 1466 acre-feet which is equivalent to a runoff depth of 4 inches over the drainage area. Surcharge storage capacity to the maximum high water elevation is an additional 1420 acre-feet; equivalent to a runoff depth over the drainage area of 4 inches. Total storage capacity of the dam is 2928 acre-feet; equivalent to 8 inches of direct runoff.

5.5 FLOODS OF RECORD

The maximum known flood occurred in 1972 during Hurricane Agnes. The pool level at this time was reported to be about 29 feet above the principal spillway crest. The calculated discharge for this flood is as follows:

Elevation (ft)	Discharge (cfs)
1742	196

5.6 OVERTOPPING POTENTIAL

Analysis indicates the total discharge capacity is sufficient to prevent overtopping from the PMF.

5.7 EVALUATION

This dam has sufficient capability to impound and adequately discharge floodwaters expected to result from the PMF.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

No signs of major distress of the dam were observed during the inspection.

b. Design and Construction Data

Design data was obtained from the Soil Conservation Service Office in Albany. Stability analyses were performed by SCS using a Swedish circle method of analysis. Various conditions were analyzed during the design process. The conditions applicable to the dam as it was constructed are as follows:

	MINIMUM FACTOR OF SAFETY	
CONDITION	UPSTREAM SLOPE	DOWNSTREAM SLOPE
Full Drawdown	1.55	____
Long Term-Steady State Seepage	____	1.80

The calculated factors of safety for this dam are in excess of the minimum factors in the Corps of Engineers recommended guidelines. The dam is therefore considered to have an adequate factor of safety for stability.

A summary of the analyses and sections showing the failure arcs are included in Appendix E.

Based on discussions with SCS representatives, the dam was built essentially according to the plans.

c. Post Construction Changes

The SCS representatives were not aware of any changes which have been made on the dam.

d. Seismic Stability

The dam is located near the boundary between seismic zones No. 1 and 2. Therefore, a seismic stability analysis is not warranted.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase 1 inspection of the BKWP Dam No. 4A did not reveal conditions which constitute a hazard to human life or property. The earth embankment is considered to be stable structurally, and capable of safely retarding floodwaters resulting from the PMF.

The design of this dam includes an internal drainage system to control the phreatic surface and to provide a safe outlet for foundation seepage.

b. Adequacy of Information

Information concerning the design and performance of this dam is considered adequate for the purposes required for Phase 1 Inspection Reports.

c. Need for Additional Investigations

No additional investigations are necessary at this time.

7.2 RECOMMENDED MEASURES

The following tasks should be undertaken by maintenance forces:

a. Continued periodic operation and lubrication of the mechanically operated slide gate mechanism to insure the ease of operation of the reservoir drain conduit.

b. Establishing a schedule for periodic maintenance which would include items such as mowing the grass on theembankment and in the emergency spillways.

APPENDIX A

PHOTOGRAPHS

Upstream Face of Dam-Looking East

Downstream Face of Dam-Looking East

West Emergency Spillway-Rock Cut-Looking Downstream

East Emergency Spillway-Looking Downstream

Principal Spillway Inlet-Riser

Principal Spillway Outlet Pipe and Plunge Pool
Looking Upstream

Principal Spillway Outlet Pipe and Plunge
Pool Looking Downstream

APPENDIX B

ENGINEERING DATA CHECKLIST

Check List
Engineering Data
Design Construction Operation

Name of Dam BKWP SITE 4A

I.D. # N.Y. 570
(191C-3681)

Item	Remarks		
	Plans	Details	Typical Sections
Dam	Yes	Yes	Yes
Spillway(s)	Yes	Yes	Yes
Outlet(s)	Yes	Yes	Yes
Design Reports	Yes		
Design Computations	Yes		
Discharge Rating Curves	F		
Dam Stability	Yes		
Seepage Studies	Yes		
Subsurface and Materials Investigations	Yes		

Item	Remarks
Construction History	INFORMATION FROM PROJECT FILES AVAILABLE
Surveys, Modifications, Post-Construction Engineering Studies and Reports	NONE REPORTED
Accidents or Failure of Dam Description, Reports	NONE REPORTED
Operation and Maintenance Records Operation Manual	NONE

APPENDIX C

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam BATAVIA KILL WATERSHED PROJECT No. 4A

I.D. # N.Y. 570 (#191C-3681)

Location: Town WINDHAM County GREENE

Stream Name BATAVIA KILL

Tributary of SCHOHARIE CREEK

Longitude (W), Latitude (N) 74° 14.8' N42° 19.9'

Hazard Category C

Date(s) of Inspection 11/21/78

Weather Conditions SNOWY 25°

b. Inspection Personnel ROBIN WARRENDER WALTER LYNICK

c. Persons Contacted ED BLACKMER - SCS - ALBANY

d. History:

Date Constructed 1970

Owner BATAVIA KILL WATERSHED DISTRICT

Designer SCS

Constructed by PIN OAK CONSTRUCTION, INC.

2) Technical Data

Type of Dam EARTH

Drainage Area 4352 ACRES

Height 57' Length 1320

Upstream Slope 1 on 3 Downstream Slope 1 on 2.5

2) Technical Data (Cont'd.)

External Drains: on Downstream Face _____ @ Downstream Toe _____

Internal Components:

Impervious Core _____

Drains INTERNAL DRAINAGE SYSTEM - 10" CMP PERFORATED

Cutoff Type _____

Grout Curtain _____

3) Embankment

a. Crest

(1) Vertical Alignment SATISFACTORY

(2) Horizontal Alignment SATISFACTORY

(3) Surface Cracks NONE

(4) Miscellaneous

b. Slopes

(1) Undesirable Growth or Debris, Animal Burrows NONE

(2) Sloughing, Subsidence or Depressions ~~Rock Riprap on Upstream Slope For Wave Action~~ NONE

(3) Slope Protection ROCK RIPRAP ON UPSTREAM SLOPE FOR WAVE ACTION

(4) Surface Cracks or Movement at Toe NONE

(5) Seepage NONE - NO FLOW OUT OF CMP DRAINS AT SIDES OF OUTLET PIPE

(6) Condition Around Outlet Structure OUTLET CHANNEL HAS HEAVY RIPRAP LINING TO TOP OF BANK

c. Abutments

(1) Erosion at Embankment and Abutment Contact NONE

(2) Seepage along Contact of Embankment and Abutment NONE

(3) Seepage at toe or along downstream face NONE

d. Downstream Area - below embankment

BERM AREA - SECTION ON EAST USED FOR ROCK SPOIL.

(1) Subsidence, Depressions, etc. NONE

(2) Seepage, unusual growth NONE

(3) Evidence of surface movement beyond embankment toe

(4) Miscellaneous

e. Drainage System

(1) Condition of relief wells, drains, etc. _____

(2) Discharge from Drainage System _____

NONE - SOME SEDIMENT COLLECTED IN INVERTS (MINOR AMOUNT)

4) Instrumentation

(1) Monumentation/Surveys NONE

(2) Observation Wells NONE

(3) Weirs NONE

(4) Piezometers NONE

(5) Other

5) Reservoir

a. Slopes VERY FLAT IN BORROW AREA - PASTURE & BRUSHLAND
IMMEDIATELY UPSTREAM OF DAM

b. Sedimentation NONE

6) Spillway(s) (including tail race channel)

a. General SATISFACTORY

b. Principle Spillway SATISFACTORY- LOG CAUGHT IN TRASH RACK

c. Emergency or Auxiliary Spillway BOTTOMS NEED MOWING ON BOTH

d. Condition of Tail race channel CONDUIT OUTLETS INTO THE PLUNGE POOL WHICH OUTLETS TO RIPRAP LINED CHANNEL. APPARENTLY THE SECTION OF CHANNEL NEAREST PLUNGE POOL OVER EXCAVATED THEN BACKFILLED WITH ROCK, HENCE WATER SURFACE DISSAPPEARS IN THIS CHANNEL SECTION THEN REAPPEARS DOWNSTREAM & CONTINUES FLOWING IN ROCK LINED CHANNEL.

e. Stability of Channel side/slopes RIPRAP LINED - SATISFACTORY

7) Downstream Channel

ROCK LINED

a. Condition (debris, etc.) SATISFACTORY

b. Slopes SATISFACTORY

c. Approximate number of homes 7 HOMES IMMEDIATELY DOWNSTREAM & THEN VILLAGE OF WINDHAM FURTHER DOWNSTREAM

8) Miscellaneous

9) Structural

a. Concrete Surfaces RISER INLET - SATISFACTORY NO SIGNS OF SPALLING OR CRACKING

b. Structural Cracking NONE

c. Movement - Horizontal & Vertical Alignment (Settlement) NONE

d. Junctions with Abutments or Embankments SATISFACTORY

e. Drains - Foundation, Joint, Face MINOR SEDIMENTATION IN INVERT OF BOTH CMP OUTLETS

f. Water passages, conduits, sluices

g. Seepage or Leakage NONE

h. Joints - Construction, etc. _____

i. Foundation _____

j. Abutments _____

k. Control Gates RESERVOIR DRAIN LAST OPERATED JULY 1978

l. Approach & Outlet Channels _____

m. Energy Dissipators (plunge pool, etc.) RIPRAPPED TO ELEV. CROWN OF CONDUIT AROUND ENTIRE POOL.

n. Intake Structures _____

o. Stability _____

p. Miscellaneous _____

APPENDIX D

HYDROLOGIC/HYDRAULIC

ENGINEERING DATA AND COMPUTATIONS

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

	Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1) Top of Dam	1757.4	137	2928
2) Design High Water (Max. Design Pool)	1751.7	118	2202
3) Auxiliary Spillway Crest	1745.2	98.0	1509
4) Pool Level with Flashboards	N/A		
5) Service Spillway Crest	1713.0	10.0	42.5

DISCHARGES

	Volume (cfs)
1) Average Daily	N/A
2) Spillway @ Maximum High Water	271
3) Spillway @ Design High Water	257
4) Spillway @ Auxiliary Spillway Crest Elevation	240
5) Low Level Outlet	32
6) Total (of all facilities) @ Maximum High Water	30260
7) Maximum Known Flood	

CREST: ELEVATION: 1757.4

Type: LEVEL, GRASSED EARTH

Width: 18 Length:

Spillover N/A

Location

SPILLWAY:

PRINCIPAL		EMERGENCY
1713	Elevation	WEST 1745.2 & EAST 1747.7
RC DROP INLET ∞	Type	TRAPEZOIDAL CHANNELS
3.5' x 10.5	Width	55' & 200'
Type of Control		
✓	Uncontrolled	✓
Controlled:		
	Type (Flashboards; gate)	
	Number	
	Size/Length	
	Invert Material	MOWED GRASS
	Anticipated Length of operating service	< 1 PER 100 YRS
42" DIA RC CONDUIT - 326'	Chute Length	600 ft
SHARP CRESTED L/b = 1.0	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	N/A BROAD CRESTED

WEIR LENGTH = 26 ft

OUTLET STRUCTURES/EMERGENCY DRAWDOWN FACILITIES: - RESERVOIR DRAIN

Type: Gate V Sluice _____ Conduit V Penstock _____

Shape : GATE - FLAT CIRCULAR CONDUIT - ROUND CAST IRON

Size: _____

Elevations: Entrance Invert 1703.75

Exit Invert 1700.0

Tailrace Channel: Elevation _____

HYDROMETEROLOGICAL GAGES:

Type : NONE

Location: _____

Records:

Date - _____

Max. Reading - _____

FLOOD WATER CONTROL SYSTEM:

Warning System: NONE

_____

Method of Controlled Releases (mechanisms):

NONE EXCEPT FOR MANUALLY OPERATED RESERVOIR DRAIN SLIDE GATE

DRAINAGE AREA: 4352

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: PASTURE & WOODLANDS

Terrain - Relief: MODERATE TO STEEP

Surface - Soil: GLACIAL TILL

Runoff Potential (existing or planned extensive alterations to existing (surface or subsurface conditions)

NONE

Potential Sedimentation problem areas (natural or man-made; present or future)

NONE

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

NONE

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the Reservoir perimeter:

Location: NONE

Elevation:

Reservoir:

Length @ Maximum Pool N/A (Miles)

Length of Shoreline (@ Spillway Crest) N/A (Miles)

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
BATAVIA K... WATERSHED SITE 4A	1		
SUBJECT		**COMPUTED BY**	**DATE**
HYDROLOGIC / HYDRAULIC COMPUTATIONS		RLW	4/5/79

DRAINAGE AREA = 4352 ACRES = 6.8 SQ. MI.

SNYDER SYNTHETIC UNIT HYDROGRATH:

$L = 10.4'' = 3.94$ mi. $\qquad L_{CA} = 4.7\text{IN} = 1.78$ mi.

$C_t \rightarrow$ USE 2.0

$t_p = C_t (L \cdot L_{CA})^{.3} = 3.59$

$t_r = \frac{t_p}{5.5} = \frac{3.59}{5.5} = .65$ (USE ½ hr. hydrograph $= t_R$)

$t_{pR} = t_p + .25(t_R - t_r) = 3.63$ hours

HR #33 PMP RAINFALL

ZONE 1 $\qquad$ PMP RAIN = 20"

6 HR	112%	24 HR	133%
12 HR	123%	48 HR	142%

TRSPC: $T.F. = 1 - \frac{.3008}{(6.8)^{.1771}} = .785$

LOSS DATA: INITIAL 1.0" $\qquad$ CONTINUOUS = .1"

BASE FLOW = 2 cfs/SQ MI $\qquad$ 2 × 6.8 = 13.6

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
BATAVIA KILL WATERSHED SITE 4A	2		
SUBJECT		**COMPUTED BY**	**DATE**
HYDROLOGIC / HYDRAULIC COMPUTATIONS		RLW	4/6/79

PRINCIPLE SPILLWAY CAPACITY

WATER SURFACE AT TOP OF DAM

$$q = A\sqrt{\frac{2gH}{1+K_e+K_s-K_eL}} = 9.62\sqrt{\frac{2(32.2)(55.7)}{1+.5+.45+.00784(326.33)}} = 271.35\ cfs$$

$A = \pi(1.75)^2 = 9.62$

$H = 1757.4 - 1701.7 = 55.7$

WATER SURFACE AT CREST OF EMERGENCY SPILLWAY

$$q = 9.62\sqrt{\frac{2(32.2)(43.5)}{1+.5+.45+.00784(326.33)}} = 239.8\ cfs$$

EMERGENCY SPILLWAY CAPACITY

WATER SURFACE AT TOP OF DAM

$$q = \overset{EAST}{C_1}L H^{3/2} + \overset{WEST}{C_2}L H^{3/2} = (3.087)(220)(9.1)^{3/2} + (3.087)(72)(12.6)^{3/2}$$

$$= 20517 + 9471 = 29988\ cfs$$

RESERVOIR DRAIN CAPACITY

WATER SURFACE AT PRINCIPAL SPILLWAY CREST

$$q = 1.77\sqrt{\frac{2(32.2)(11.3)}{1+.5+0+(.0243)(30)}} = 31.98$$

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
BATAVIA KILL WATERSHED SITE 4A	3		
SUBJECT		**COMPUTED BY**	**DATE**
HYDROLOGIC/HYDRAULIC COMPUTATIONS		RLW	4/18/79

DEPTH OF FLOW IN EMERGENCY SPILLWAYS

CREST ELEVATIONS: EAST SPILLWAY 1747.7

WEST SPILLWAY 1745.2

½PMF OUTFLOW (FROM HEC-1) = 5008 cfs

ASSUME WATER LEVEL = 1750.3

EAST SPILLWAY

$Q_1 = 3.087(224)(2.5)^{3/2} = 2684$

WEST SPILLWAY

$Q_2 = (3.087)(69)(4.9)^{3/2} = 2310$

$Q_{TOTAL} = 4995$ cfs

∴ WATER LEVEL DURING ½PMF ≅ 1750.3

PMF OUTFLOW (FROM HEC-1) = 11529 cfs

ASSUME WATER LEVEL = 1752.4

EAST SPILLWAY

$Q_1 = (3.087)(224)(4.7)^{3/2} = 7046$

$Q_2 = 3.087(75)(7.2)^{3/2} = 4473$

$Q_{TOTAL} = 11519$ cfs

∴ WATER LEVEL DURING PMF ≅ 1752.4

```
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  25 SEP 78
**********************************
    1                 A BATAVIA KILL SITE 4A
    2                 A PMF WITH RATIOS - ANALYSIS
    3                 A3 DATE
    4                 B    100       0      30       0       0       0       0       0       0       0
    5                 B1     5
    6                 J      1       2       1
    7                 J1    .5       1
    8                 K      0       1                                               1
    9                 K1                                    INFLOW HYDROGRAPH
   10                 M      1       1     6.8                               .785                    1
   11                 P      0      20     112     123     133     142
   12                 T                                                       1      .1
   13                 W      3   0.625
   14                 X     14      14       1
   15                 K      1       1                                               1
   16                 K1 ROUTED HYDROGRAPH AT DAM  NO BREACH
   17                 Y                                     1       1
   18                 Y1     1                                                  42.5                    9
   19                 Y2  42.5    1509    2928                                                       9
   20                 Y3     0     272   30260                                                       9
   21                 K     99
```

```
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  25 SEP 78
**********************************

RUN  DATE= 04/13/79
     TIME= 22.03.35.


                BATAVIA KILL SITE 4A
                PMF WITH RATIOS - ANALYSIS
                 DATE

                                JOB SPECIFICATION .
                 IN      NHR     NMIN     IDAY      IHR     IMIN    METRC     IPLT     IPRT    NSTAN
                100       0       30        0        0        0        0        0        0        0
                                        JOPER      NWT   LROPT   TRACE
                                            5        0        0        0


                                MULTI-PLAN ANALYSES TO BE PERFORMED
                                    NPLAN= 1 NRTIO= 2 LRTIO= 1
                          RTIOS=     .50   1.00


**********      **********      **********      **********      **********

                                SUB-AREA RUNOFF COMPUTATION

                                    INFLOW HYDROGRAPH

                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                  1       0       0       0       0       0       1       0       0

                                    HYDROGRAPH DATA
                 IHYDG    IUHG    TAREA    SNAP   TRSDA   TRSPC    RATIO   ISNOW   ISAME   LOCAL
                     1       1    6.80     0.00    6.80     .79   0.000       0       1       0

                                    PRECIP DATA
                              SPFE     PMS      R6     R12     R24     R48     R72     R96
                              0.00   20.00  112.00  123.00  133.00  142.00    0.00    0.00

                                    LOSS DATA
              LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL.  CNSTL   ALSMX   RTIMP
                  0    0.00    0.00    1.00    0.00    0.00    1.00    1.00     .10    0.00    0.00

                                UNIT HYDROGRAPH DATA
                                TP=  3.00    CP= .63    NTA=  0

                                    RECESSION DATA
                                STRTQ=   14.00    QRCSN=   14.00    RTIOR= 1.00
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 6.86 AND R= 5.37 INTERVALS

                UNIT HYDROGRAPH 33 END-OF-PERIOD ORDINATES, LAG=  2.99 HOURS, CP=  .63  VOL= 1.00
                  59.     215.     426.     650.     831.     927.     918.     809.     671.     557.
                 462.     383.     318.     264.     219.     181.     150.     125.     104.      86.
                  71.      59.      49.      41.      34.      28.      23.      19.      16.      13.
                  11.       9.       8.

                                    END-OF-PERIOD FLOW
      0
   MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS     COMP Q       MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS     COMP Q
```

1.01	1.30	3	.00	0.00	.00	14.	1.02	2.30	53	.05	.00	.05	30.
1.01	2.00	4	.00	0.00	.00	14.	1.02	3.00	54	.05	.00	.05	31.
1.01	2.30	5	.00	0.00	.00	14.	1.02	3.30	55	.05	.00	.05	31.
1.01	3.00	6	.00	0.00	.00	14.	1.02	4.00	56	.05	.00	.05	32.
1.01	3.30	7	.00	0.00	.00	14.	1.02	4.30	57	.05	.00	.05	32.
1.01	4.00	8	.00	0.00	.00	14.	1.02	5.00	58	.05	.00	.05	33.
1.01	4.30	9	.00	0.00	.00	14.	1.02	5.30	59	.05	.00	.05	33.
1.01	5.00	10	.00	0.00	.00	14.	1.02	6.00	60	.05	.00	.05	33.
1.01	5.30	11	.00	0.00	.00	14.	1.02	6.30	61	.14	.09	.05	39.
1.01	6.00	12	.00	0.00	.00	14.	1.02	7.00	62	.14	.09	.05	59.
1.01	6.30	13	.01	0.00	.01	14.	1.02	7.30	63	.14	.09	.05	98.
1.01	7.00	14	.01	0.00	.01	14.	1.02	8.00	64	.14	.09	.05	157.
1.01	7.30	15	.01	0.00	.01	14.	1.02	8.30	65	.14	.09	.05	233.
1.01	8.00	16	.01	0.00	.01	14.	1.02	9.00	66	.14	.09	.05	318.
1.01	8.30	17	.01	0.00	.01	14.	1.02	9.30	67	.14	.09	.05	402.
1.01	9.00	18	.01	0.00	.01	14.	1.02	10.00	68	.14	.09	.05	476.
1.01	9.30	19	.01	0.00	.01	14.	1.02	10.30	69	.14	.09	.05	538.
1.01	10.00	20	.01	0.00	.01	14.	1.02	11.00	70	.14	.09	.05	589.
1.01	10.30	21	.01	0.00	.01	14.	1.02	11.30	71	.14	.09	.05	631.
1.01	11.00	22	.01	0.00	.01	14.	1.02	12.00	72	.14	.09	.05	667.
1.01	11.30	23	.01	0.00	.01	14.	1.02	12.30	73	.88	.83	.05	739.
1.01	12.00	24	.01	0.00	.01	14.	1.02	13.00	74	.88	.83	.05	922.
1.01	12.30	25	.06	0.00	.06	14.	1.02	13.30	75	1.06	1.01	.05	1265.
1.01	13.00	26	.06	0.00	.06	14.	1.02	14.00	76	1.06	1.01	.05	1797.
1.01	13.30	27	.07	0.00	.07	14.	1.02	14.30	77	1.32	1.27	.05	2513.
1.01	14.00	28	.07	0.00	.07	14.	1.02	15.00	78	1.32	1.27	.05	3377.
1.01	14.30	29	.09	0.00	.09	14.	1.02	15.30	79	1.60	1.55	.05	4337.
1.01	15.00	30	.09	0.00	.09	14.	1.02	16.00	80	5.08	5.03	.05	5540.
1.01	15.30	31	.11	0.00	.11	14.	1.02	16.30	81	1.23	1.18	.05	7063.
1.01	16.00	32	.34	.04	.30	17.	1.02	17.00	82	1.23	1.18	.05	8700.
1.01	16.30	33	.08	.03	.05	25.	1.02	17.30	83	.97	.92	.05	10246.
1.01	17.00	34	.08	.03	.05	42.	1.02	18.00	84	.97	.92	.05	11439.
1.01	17.30	35	.07	.02	.05	65.	1.02	18.30	85	.08	.03	.05	12054.
1.01	18.00	36	.07	.02	.05	91.	1.02	19.00	86	.08	.03	.05	11956.
1.01	18.30	37	.01	0.00	.01	114.	1.02	19.30	87	.08	.03	.05	11166.
1.01	19.00	38	.01	0.00	.01	130.	1.02	20.00	88	.08	.03	.05	10005.
1.01	19.30	39	.01	0.00	.01	134.	1.02	20.30	89	.08	.03	.05	8743.
1.01	20.00	40	.01	0.00	.01	128.	1.02	21.00	90	.08	.03	.05	7472.
1.01	20.30	41	.01	0.00	.01	116.	1.02	21.30	91	.08	.03	.05	6285.
1.01	21.00	42	.01	0.00	.01	102.	1.02	22.00	92	.08	.03	.05	5259.
1.01	21.30	43	.01	0.00	.01	88.	1.02	22.30	93	.08	.03	.05	4408.
1.01	22.00	44	.01	0.00	.01	75.	1.02	23.00	94	.08	.03	.05	3701.
1.01	22.30	45	.01	0.00	.01	65.	1.02	23.30	95	.08	.03	.05	3115.
1.01	23.00	46	.01	0.00	.01	56.	1.03	0.00	96	.08	.03	.05	2628.
1.01	23.30	47	.01	0.00	.01	49.	1.03	.30	97	0.00	0.00	0.00	2223.
1.02	0.00	48	.01	0.00	.01	43.	1.03	1.00	98	0.00	0.00	0.00	1882.
1.02	.30	49	.05	.00	.05	38.	1.03	1.30	99	0.00	0.00	0.00	1592.
1.02	1.00	50	.05	.00	.05	35.	1.03	2.00	100	0.00	0.00	0.00	1344.
									SUM	22.29	18.62	3.67	158143.
										(566.)	(473.)	(93.)	(4478.11)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	12054.	9211.	3241.	1575.	157464.
CMS	341.	261.	92.	45.	4459.
INCHES		12.60	17.74	17.95	17.95
MM		320.04	450.48	455.95	455.95
AC-FT		4567.	6429.	6507.	6507.
THOUS CU M		5634.	7930.	8026.	8026.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 1

7. 7. 7. 7. 7. 7. 7. 7. 7. 7.

7.	8.	13.	21.	32.	45.	57.	65.	67.	64.
58.	51.	44.	38.	32.	28.	24.	21.	19.	17.
16.	15.	15.	15.	16.	16.	16.	16.	16.	17.
19.	29.	49.	79.	117.	159.	201.	238.	269.	295.
316.	333.	370.	461.	632.	899.	1256.	1689.	2169.	2770.
3532.	4350.	5123.	5720.	6027.	5978.	5583.	5003.	4371.	3736.
3142.	2629.	2204.	1850.	1557.	1314.	1112.	941.	796.	672.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	6027.	4605.	1621.	787.	78732.
CMS	171.	130.	46.	22.	2229.
INCHES		6.30	8.87	8.98	8.98
MM		160.02	225.24	227.97	227.97
AC-FT		2284.	3214.	3253.	3253.
THOUS CU M		2817.	3965.	4013.	4013.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 2

14.	14.	14.	14.	14.	14.	14.	14.	14.	14.
14.	14.	14.	14.	14.	14.	14.	14.	14.	14.
14.	14.	14.	14.	14.	14.	14.	14.	14.	14.
14.	17.	25.	42.	65.	91.	114.	130.	134.	128.
116.	102.	88.	75.	65.	56.	49.	43.	38.	35.
32.	31.	30.	31.	31.	32.	32.	33.	33.	33.
39.	59.	98.	157.	233.	318.	402.	476.	538.	589.
631.	667.	739.	922.	1265.	1797.	2513.	3377.	4337.	5540.
7063.	8700.	10246.	11439.	12054.	11956.	11166.	10005.	8743.	7472.
6285.	5259.	4408.	3701.	3115.	2628.	2223.	1882.	1592.	1344.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	12054.	9211.	3241.	1575.	157464.
CMS	341.	261.	92.	45.	4459.
INCHES		12.00	17.74	17.95	17.95
MM		320.04	450.48	455.95	455.95
AC-FT		4567.	6429.	6507.	6507.
THOUS CU M		5634.	7930.	8026.	8026.

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

ROUTED HYDROGRAPH AT DAM NO BREACH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	43.	0

STORAGE	42.50	1509.00	2928.00	0.00	0.00	0.00	0.00	0.00	0.00	9.00
OUTFLOW	0.00	272.00	30260.00	0.00	0.00	0.00	0.00	0.00	0.00	9.00

STATION 1, PLAN 1, RTIO 1

OUTFLOW

```
                                                                                  1.        1.
      1.        1.        1.        1.        1.        1.        1.        1.        1.        1.
      1.        2.        2.        2.        2.        2.        3.        3.        3.        4.
      4.        5.        5.        5.        6.        6.        6.        6.        6.        6.
      6.        6.        6.        7.        7.        7.        7.        7.        7.        7.
      7.        7.        7.        8.        9.       10.       11.       12.       14.       16.
     19.       21.       23.       26.       30.       36.       44.       55.       69.       87.
    111.      140.      175.      215.      258.     2684.     4566.     5008.     4813.     4351.
   3797.     3243.     2741.     2307.     1940.     1634.     1378.     1164.      985.      832.

                                        STOR
     43.       43.       43.       44.       44.       44.       44.       45.       45.       45.
     46.       46.       46.       46.       47.       47.       47.       47.       48.       48.
     48.       48.       49.       49.       49.       49.       50.       50.       50.       50.
     50.       51.       51.       52.       53.       54.       56.       59.       61.       64.
     66.       68.       70.       72.       73.       74.       75.       75.       76.       76.
     77.       77.       76.       78.       78.       79.       77.       79.       80.       80.
     81.       81.       83.       85.       89.       94.      101.      110.      120.      131.
    142.      155.      169.      185.      206.      236.      279.      338.      415.      514.
    640.      798.      987.     1203.     1436.     1623.     1712.     1733.     1724.     1702.
   1676.     1650.     1626.     1605.     1588.     1573.     1561.     1551.     1543.     1536.

                                        STAGE
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0

                          PEAK    6-HOUR   24-HOUR   72-HOUR   TOTAL VOLUME
                 CFS     5008.     3159.      885.      426.       42608.
                 CMS      142.       89.       25.       12.        1207.
              INCHES                4.32      4.84      4.86         4.86
                  MM              109.75    123.05    123.38       123.38
               AC-FT               1566.     1756.     1761.        1761.
          THOUS CU M               1932.     2166.     2172.        2172.


                        MAXIMUM STORAGE =     1733.


                        STATION       1, PLAN 1, RTIO 2

                                       OUTFLOW
      0.        0.        0.        0.        1.        1.        1.        1.        1.        1.
      1.        1.        1.        1.        2.        2.        2.        2.        2.        2.
      2.        2.        2.        2.        2.        3.        3.        3.        3.        3.
      3.        3.        3.        3.        4.        4.        5.        6.        7.        8.
      9.       10.       10.       11.       11.       12.       12.       12.       12.       13.
     13.       13.       13.       13.       13.       13.       14.       14.       14.       14.
     14.       14.       15.       16.       17.       19.       22.       25.       29.       33.
     37.       42.       47.       53.       61.       72.       88.      110.      138.      175.
    222.      924.     6121.     8991.    10666.    11480.    11529.    10956.     9994.     8847.
   7650.     6509.     5490.     4617.     3882.     3268.     2756.     2328.     1969.     1664.

                                        STOR
     43.       44.       44.       45.       45.       46.       46.       47.       48.       48.
     49.       49.       50.       50.       51.       51.       52.       52.       53.       53.
     54.       54.       55.       55.       56.       56.       57.       57.       58
```

```
                                                                                        110.
   111.      112.      113.      113.      114.      115.      116.      116.      117.      118.
   119.      120.      123.      128.      135.      146.      160.      177.      197.      219.
   242.      268.      295.      327.      370.      430.      516.      634.      788.      986.
  1238.     1540.     1786.     1922.     2001.     2039.     2042.     2015.     1969.     1915.
  1858.     1804.     1756.     1715.     1680.     1651.     1627.     1606.     1589.     1575.

                                        STAGE
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0

                           PEAK    6-HOUR    24-HOUR    72-HOUR   TOTAL VOLUME
                  CFS     11529.     8478.     2504.      1204.        120394.
                  CMS       326.      240.       71.        34.          3409.
               INCHES                11.60     13.70      13.72          13.72
                   MM               294.57    347.96     348.61         348.61
                AC-FT                4204.     4966.      4975.          4975.
           THOUS CU M                5185.     6125.      6137.          6137.


                              MAXIMUM STORAGE =     2042.


   **********          **********          **********          **********          **********
```

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 .50	RATIO 2 1.00
HYDROGRAPH AT	1	6.80	1	6027.	12054.
	(	17.61)	(	170.67)(	341.34)(
ROUTED TO	1	6.80	1	5008.	11529.
	(	17.61)	(	141.81)(	326.47)(

APPENDIX E

STABILITY COMPUTATIONS

3 -- W. S. Atkinson -- 3/9/67
Lorn P. Dunnigan
Subj: ENG 22-5, New York WP-08, Batavia Kill, Site No. 4A

Test series No. 2 was made on specimens that contained 35 percent gravel between the Number 4 and the 3/4 inch size. This test was made at 98 percent of Proctor density also (Re: compaction test No. 2A). The saturated shear strength values are $\phi = 32°$, c = 175 psf for total stress and $\bar{\phi} = 38°$, $\bar{c} = 100$ psf for effective stress. These values are considered representative of the range of materials for compaction to 98 percent of Proctor on the minus 3/4 inch fraction (ASTM D698 method C).

SLOPE STABILITY

The stability of the proposed 3 1/2:1 upstream and the 2 1/2:1 downstream slope was checked by a Swedish circle method of analyses. A phreatic line was assummed from emergency spillway elevation to a drain at c/b = 0.6. The analyses was based on the embankment only. The foundation was considered sufficiently strong to limit failure to the embankment.

A computer was used for the analyses. Each set of shear parameters was considered individually in the analyses and the factor of safety is reported on the attached slope stability summary. The low factors of safety obtained are Fs = 1.55 (Trial No. 2) for the upstream slope with full drawdown considered and Fs = 1.80 (Trial No. 4A) for the 2 1/2:1 downstream slope. These are above the suggested minimums.

SETTLEMENT STRAINS

The embankment will be constructed of low plasticity material that is subject to cracking at relatively low strain. It will be necessary to flatten longitudinal slopes such as channel banks, principal spillway trench, etc. to 3:1.

RECOMMENDATIONS

A. Site Preparation: Longitudinal slopes should be no steeper than 3:1 to reduce the possibility of differential settlement cracks.

The floodplain debris (tree stumps, etc.) refered to in the geology report should be stripped from the foundation.

The geology report also calls attention to the large boulders on the left abutment that may require removal.

B. Cutoff: We recommend that the cutoff trench bottom below the zone of alluvial gravel (GW and GP) that occurs primarily above elevation 1690. This will require trench depths ranging from about 4 feet in the channel are to 15 or 20 feet at the edges of the floodplain.

Form SCS 357
Rev. 6-65

U.S. DEPARTMENT of AGRICULTURE
SOIL CONSERVATION SERVICE

SUMMARY - SLOPE STABILITY ANALYSIS

MATERIALS TESTING REPORT

PROJECT and STATE

METHOD OF ANALYSIS

ANALYZED AT

APPROVED BY LPD

DATE

	SOURCE AND USE OF MATERIALS	CLASSIFICATION	ADOPTED DESIGN DATA: Yd (pcf)	Ym (pcf)	Ysol (pcf)	Ysub (pcf)	Φ (deg.)	tan Φ	c (psf)	REMARKS: Type Test
①	Emb } 20% Rock	SM-SC	129.8	132.0	142.5		26.5	0.499	350	CU
②	Found }	SC-SM	130.8	132.0	142.5		28.5	0.543	350	CU
③	Emb } 35% Rock	SC-SM	135.0	142.5	146.0		32.0	0.625	175	CU
④	Found }	SC-SM	135.0	142.5	146.0		38.0	0.781	100	CU
⑤										
⑥										
⑦										
⑧										

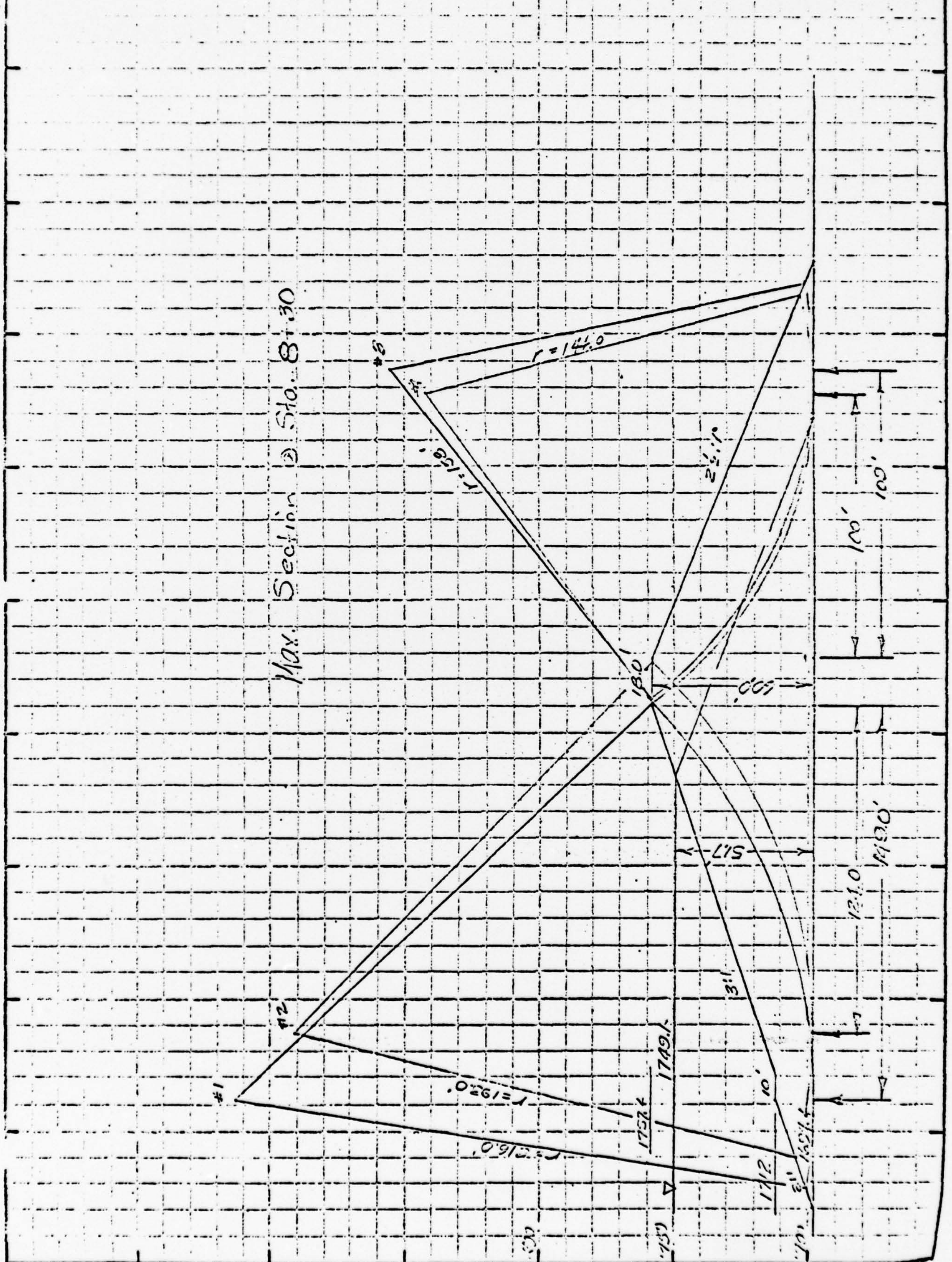
TRIAL NO.		SLOPE	CONDITIONS	F_s
			Max. Section @ Sta. 8+30	
Up	1	3:1	Full drawdown - 10' berm @ elev 1712.0 - Arc cut in same slope thru Emb (38°-100) only.	1.71
Up	1A	3:1	Same as #1 but Emb (32°-175).	1.57
Up	1B	3:1	Same as #1 but Emb (33.5°-250).	1.74
Up	2	3:1	Full drawdown - 10' berm @ elev. 1712.0 - Arc cut from opp. shoulder thru Emb (26.5°-350) only.	1.55
Dn	3	2½:1	Drain @ c/b = 0.6 - No berm - Arc cut from opp. shoulder thru Emb (38°-100) only	2.2
Dn	3A	2½:1	Same as #3 but Emb (32°-175).	1.96
Dn	4	2½:1	Drain @ c/b = 0.6 - No berm - Arc cut from opp. shoulder thru Emb (33.5°-350) only.	2.2
Dn	4A	2½:1	Same as #4 but Emb (26.5°-350).	1.80

THIS PAGE IS BEST QUALITY PRACTICABLE
COPY FURNISHED TO DDG

Sheet ___ of ___

Continuation of Sheet 1 of 2

Batavia Kill #4A New York



Scale 1 inch = feet

APPENDIX F

REFERENCES

APPENDIX F

REFERENCES

1) U.S. Department of Commerce, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, May 1961.

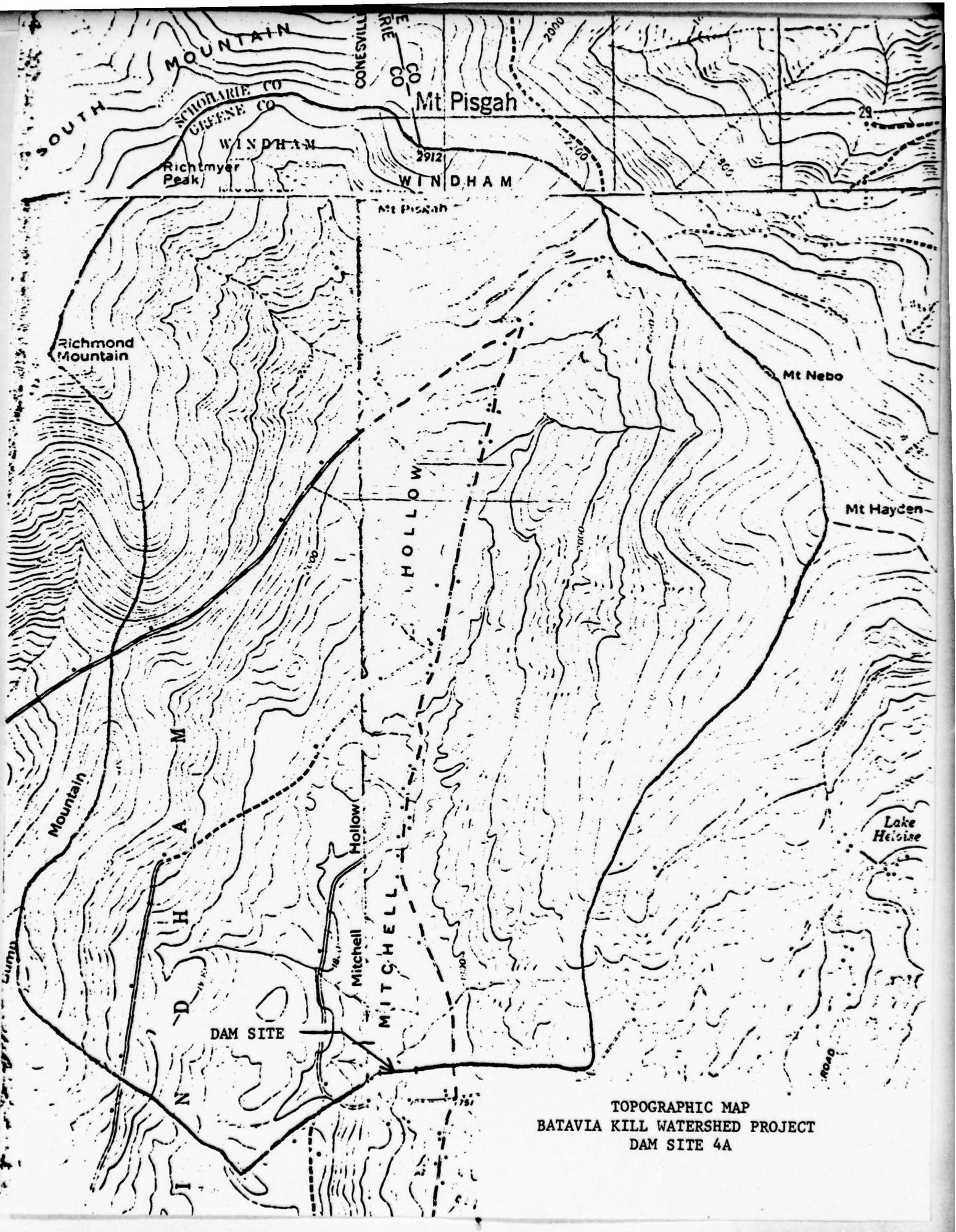
2) H.W. King and E.F. Brater, Handbook of Hydraulics, 5th edition, McGraw-Hill, 1963.

3) University of the State of New York, Geology of New York, Education Leaflet 20, Reprinted 1973.

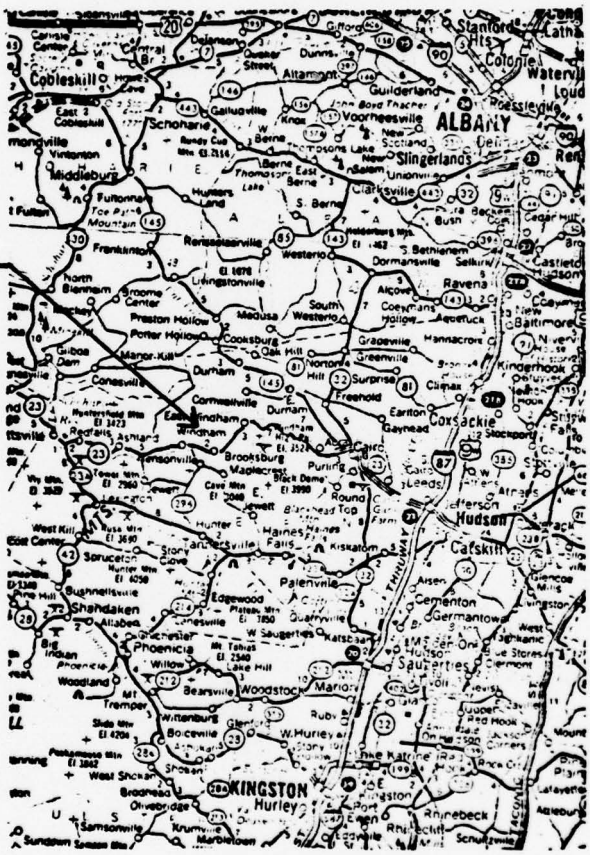
4) Elwyn E. Seelye, Design, 3rd edition, John Wiley and Sons, Inc., 1960

APPENDIX G

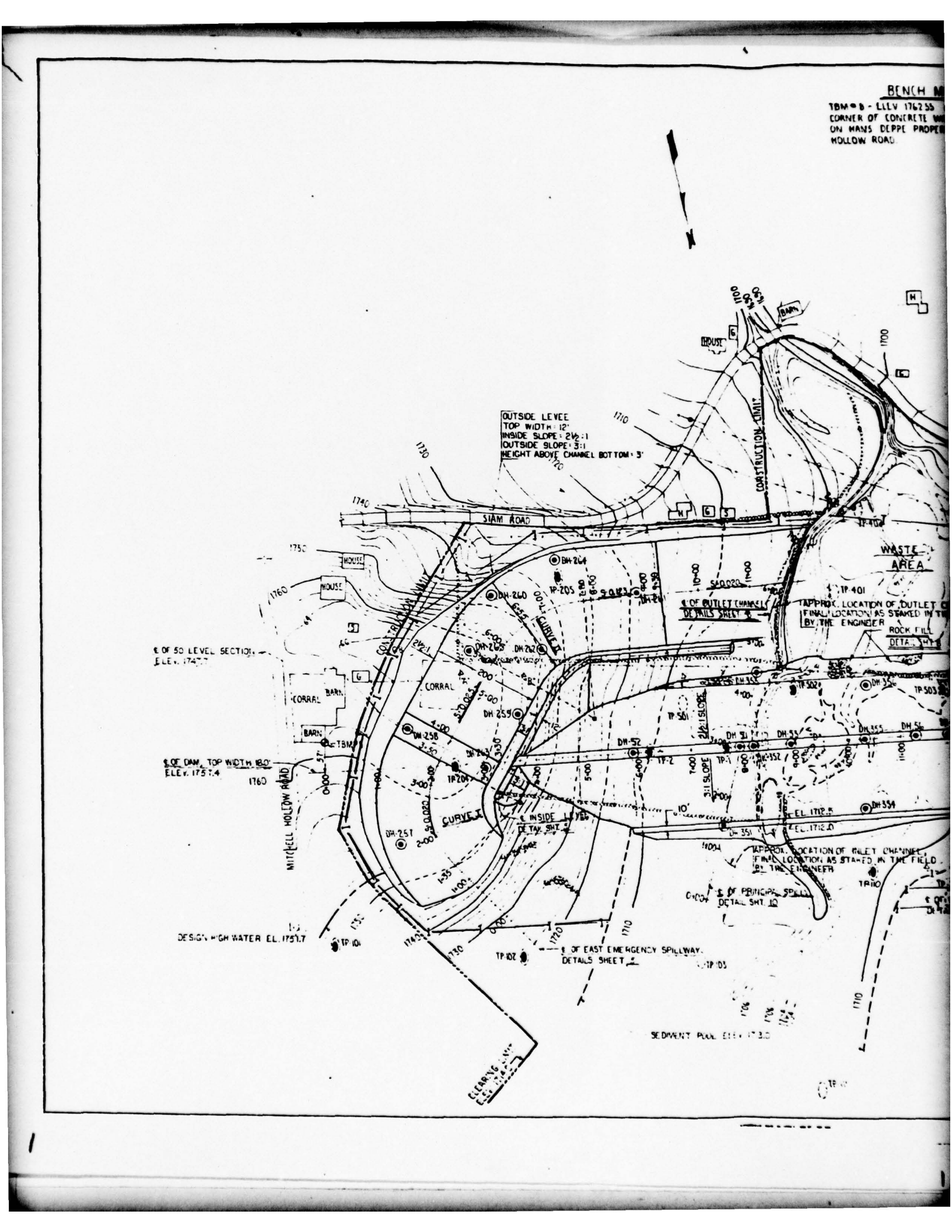
DRAWINGS



TOPOGRAPHIC MAP
BATAVIA KILL WATERSHED PROJECT
DAM SITE 4A



VICINITY MAP
BATAVIA KILL WATERSHED PROJECT
DAM SITE 4A

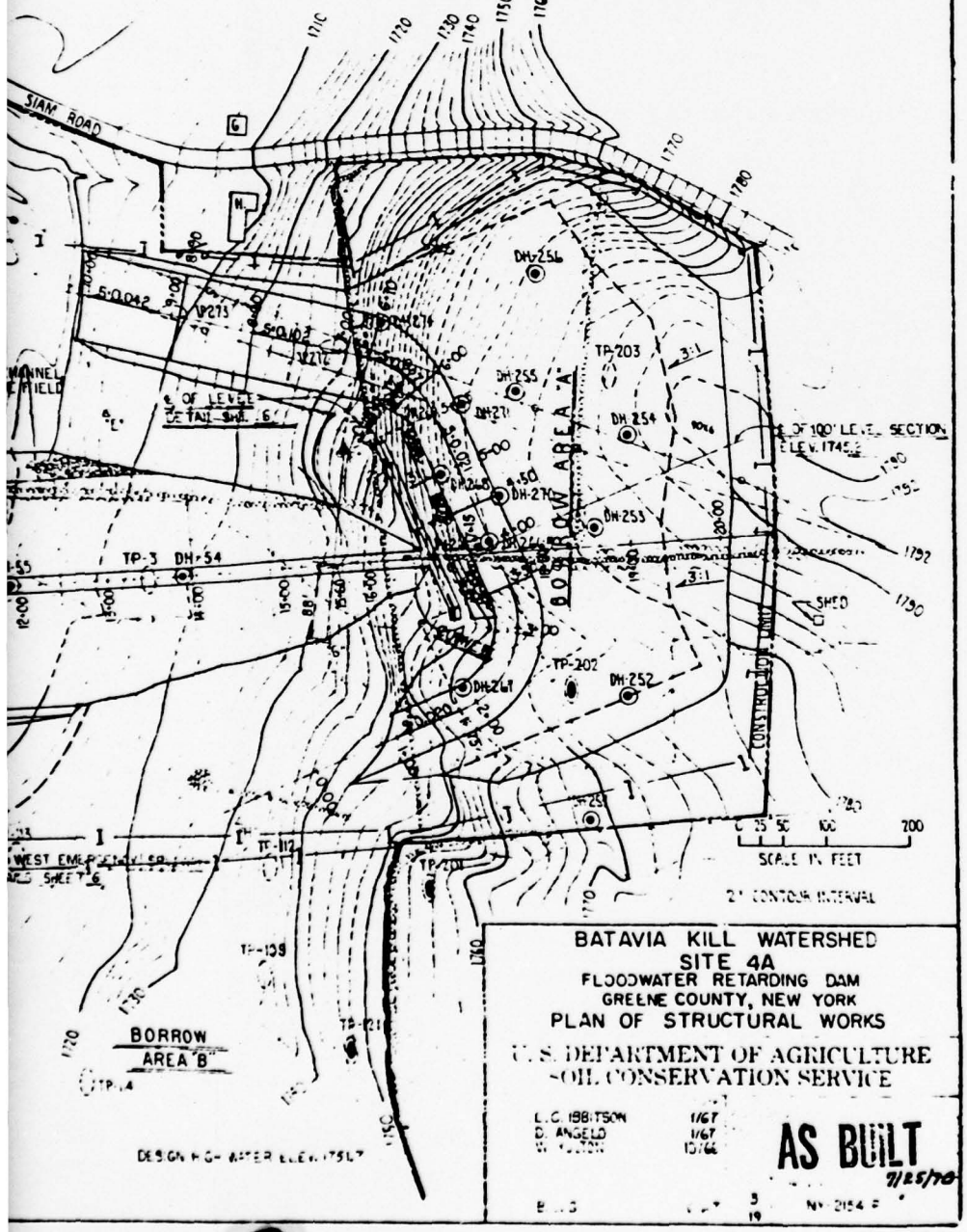

BENCH M
TBM ⊕ B - ELEV 1762.55
CORNER OF CONCRETE
ON HANS DEPPE PROPE
HOLLOW ROAD
OUTSIDE LEVEE
TOP WIDTH = 12'
INSIDE SLOPE = 2½:1
OUTSIDE SLOPE = 3:1
HEIGHT ABOVE CHANNEL BOTTOM = 3'
CONSTRUCTION LIMIT
SIAM ROAD
HOUSE
HOUSE
BARN
CORRAL
BARN
CORRAL
WASTE AREA
℄ OF OUTLET CHANNEL
DETAILS SHEET
APPROX. LOCATION OF OUTLET C
FINAL LOCATION AS STAKED IN TH
BY THE ENGINEER
ROCK FILL
DETA
℄ OF 50 LEVEL SECTION
ELEV. 1747.7
CONTROL LINE
CURVE II
CURVE I
℄ DAM, TOP WIDTH 180'
ELEV. 1757.4
MITCHELL HOLLOW ROAD
TBM
℄ INSIDE LEVEE
DETAIL SHT.
3:1 SLOPE
2½:1 SLOPE
APPROX. LOCATION OF INLET CHANNEL
FINAL LOCATION AS STAKED IN THE FIELD
BY THE ENGINEER
℄ OF PRINCIPAL SPILL
DETAIL SHT. 10
℄ OF EAST EMERGENCY SPILLWAY
DETAILS SHEET
DESIGN HIGH WATER EL. 1751.7
SEDIMENT POOL ELEV. 1713.0
CLEARING
TP 101
TP 102
TP 103
TP 201
TP 202
TP 203
TP 204
TP 205
TP 401
TP 501
TP 502
TP 503
TP 1
TP 2
DH-257
DH-258
DH-259
DH-260
DH-261
DH-262
DH-263
DH-264
DH-52
DH-351
DH-352
DH-353
DH-354
DH-355
DH-56
EL. 1712.5
EL. 1712.0
S=0.023
S=0.083
S=0.0085
S=0.0022

ARK DESCRIPTION

CHISELED SQUARE ON NORTHWEST
LL AROU... NORTHERN MOST BARN
TY. APPROX 70' WEST OF NITCH...

LEGEND

- INTERMITTENT STREAM
- 1710 — 1710 — CONTOUR LINE
- WOODS LINE
- ROCK FENCE & ROCK PILE
- WIRE FENCE (EXISTING)
- WOODEN FENCE
- BLACK TOP ROAD
- BUILDINGS
- POWERLINE WITH POLES LOCATED
- TELEPHONE LINE WITH POLES LOCATED
- HUB STATION
- TEMPORARY BENCH MARK
- SEDIMENT POOL
- CREST OF EMERGENCY SPILLWAY
- DESIGN HIGH WATER
- DRILL HOLES
- TEST PIT (LOGGED & SAMPLED)
- TEST PIT (LOGGED ONLY)
- CONSTRUCTION LIMITS
- FENCING (TO BE INSTALLED)



BATAVIA KILL WATERSHED
SITE 4A
FLOODWATER RETARDING DAM
GREENE COUNTY, NEW YORK
PLAN OF STRUCTURAL WORKS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

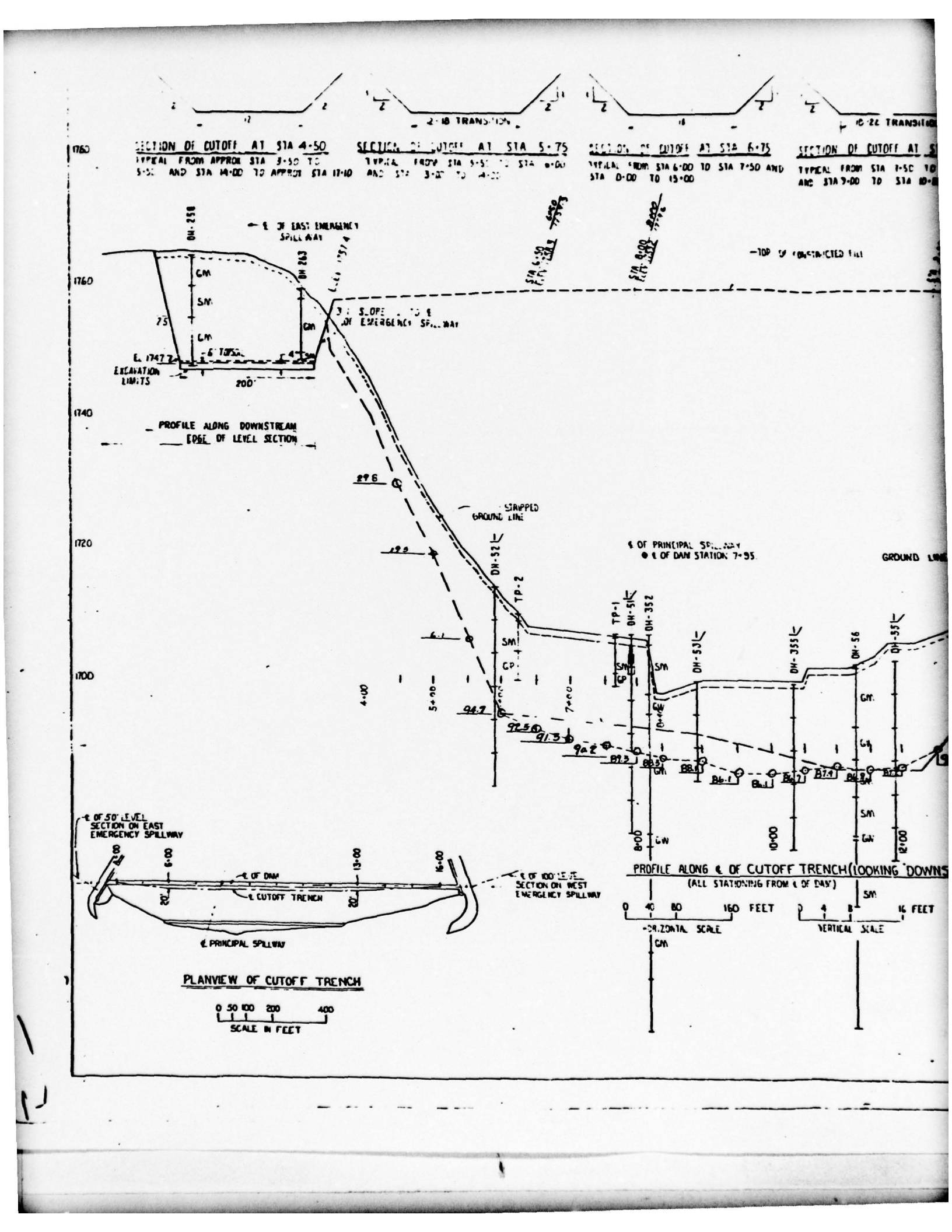
L.C. IBBITSON 1/67
D. ANGELO 1/67
[illegible] 10/66

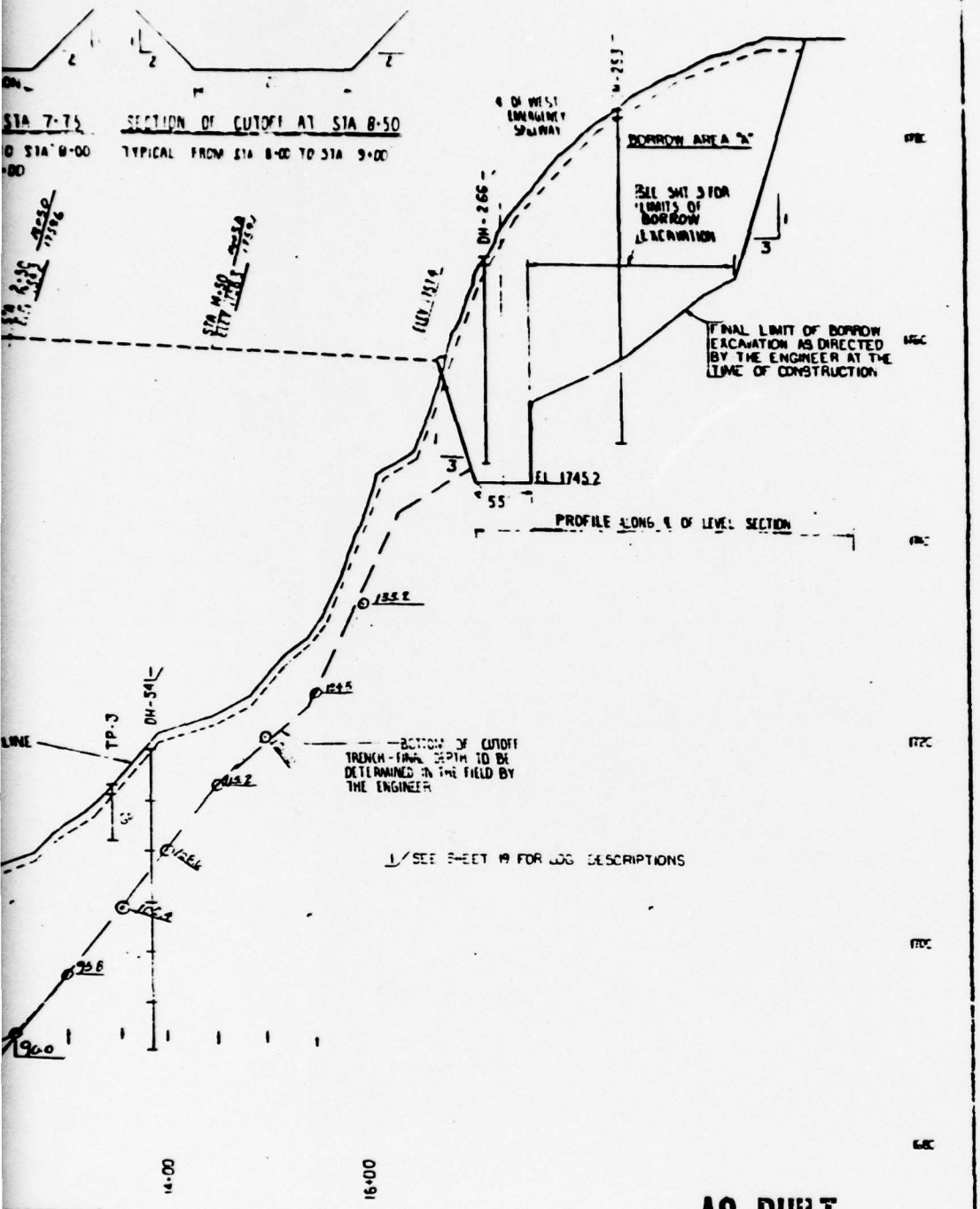
AS BUILT
7/25/70

B...G ... 3 19 NY-215A-P

SCS-313 (9-67)

2


SECTION OF CUTOFF AT STA 4+50
TYPICAL FROM APPROX STA 3+50 TO 5+50 AND STA 14+00 TO APPROX STA 17+10
SECTION OF CUTOFF AT STA 5+75
SECTION OF CUTOFF AT STA 6+75
TYPICAL FROM STA 6+00 TO STA 7+50 AND STA 0+00 TO 13+00
SECTION OF CUTOFF AT S
TYPICAL FROM STA 7+50 TO AND STA 9+00 TO STA 10+8
1760
1740
1720
1700
DH-258
DH-263
℄ OF EAST EMERGENCY SPILLWAY
GM
SM
GM
75
E. 1747.7
EXCAVATION LIMITS
200
PROFILE ALONG DOWNSTREAM EDGE OF LEVEL SECTION
STA 6+50
STA 8+00
TOP OF CONSTRUCTED FILL
3:1 SLOPE TO ℄ OF EMERGENCY SPILLWAY
STRIPPED GROUND LINE
℄ OF PRINCIPAL SPILLWAY
℄ OF DAM STATION 7+95
GROUND LINE
DH-52
TP-2
TP-1
DH-51
DH-352
DH-53
DH-355
DH-56
DH-351
SM
GP
GW
4+00
5+00
7+00
8+00
10+00
12+00
99.6
99.6
94.7
92.5
91.3
90.2
89.3
88.3
86.1
87.9
℄ OF 50' LEVEL SECTION ON EAST EMERGENCY SPILLWAY
℄ OF DAM
℄ CUTOFF TRENCH
℄ PRINCIPAL SPILLWAY
℄ OF 100' LEVEL SECTION ON WEST EMERGENCY SPILLWAY
PLANVIEW OF CUTOFF TRENCH
0 50 100 200 400
SCALE IN FEET
PROFILE ALONG ℄ OF CUTOFF TRENCH (LOOKING DOWNS
(ALL STATIONING FROM ℄ OF DAM)
0 40 80 160 FEET
HORIZONTAL SCALE
0 4 8 16 FEET
VERTICAL SCALE



AS BUILT

7/25/70

BATAVIA KILL WATERSHED
SITE 4A
FLOODWATER RETARDING DAM
GREENE COUNTY, NEW YORK
CUT-OFF TRENCH EXCAVATION

DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

L.C. BBITSON 2/67
DONALD LAKE 2/67

B.M.G. SHT 4 OF 19 NY-2154-P

LAYOUT DATA CURVE II

Δ = 56° 0
R = 2250
D = 25° 28
L = 2200

T = 1196
E = 298
M = 263

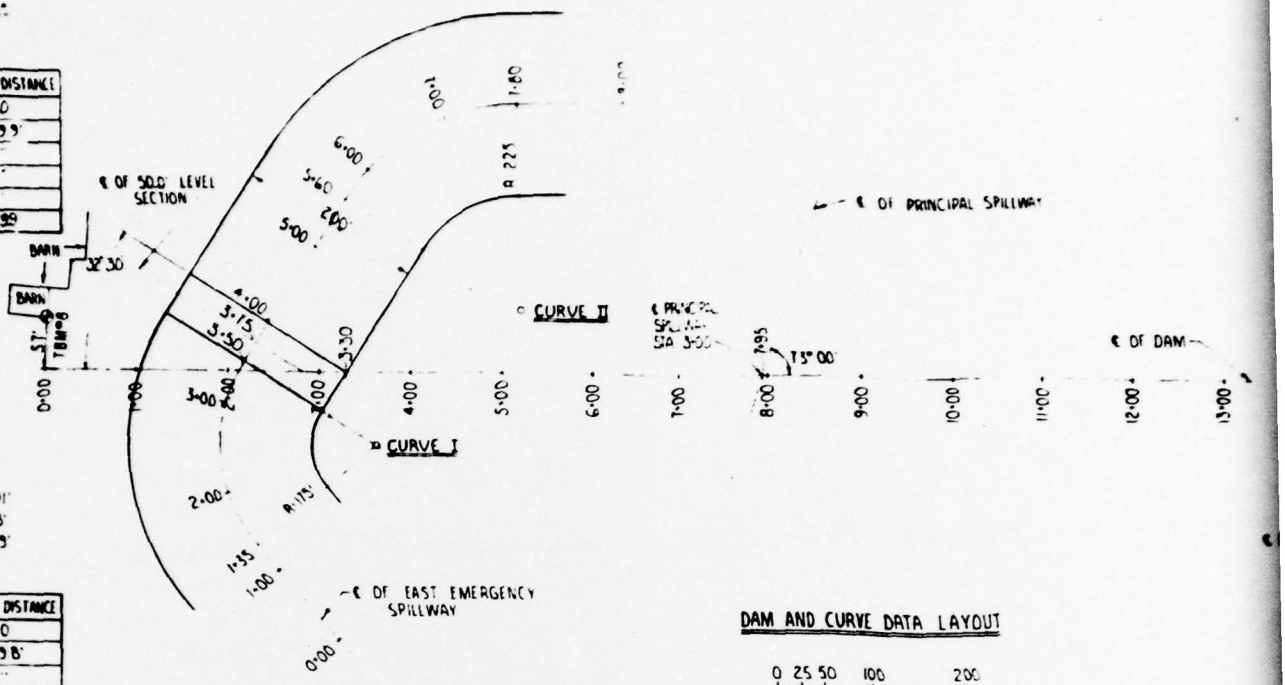
℄ STATION	DEFLECTION Δ	CHORD DISTANCE
PC 5+60	0	0
6+10	6° 22	499
6+60	12° 44	
7+10	19° 06	
7+60	25° 28	
PT 7+80	28° 00 30"	199

LAYOUT DATA CURVE I

Δ = 70° 23
R = 175 0
D = 32° 44
L = 215 0

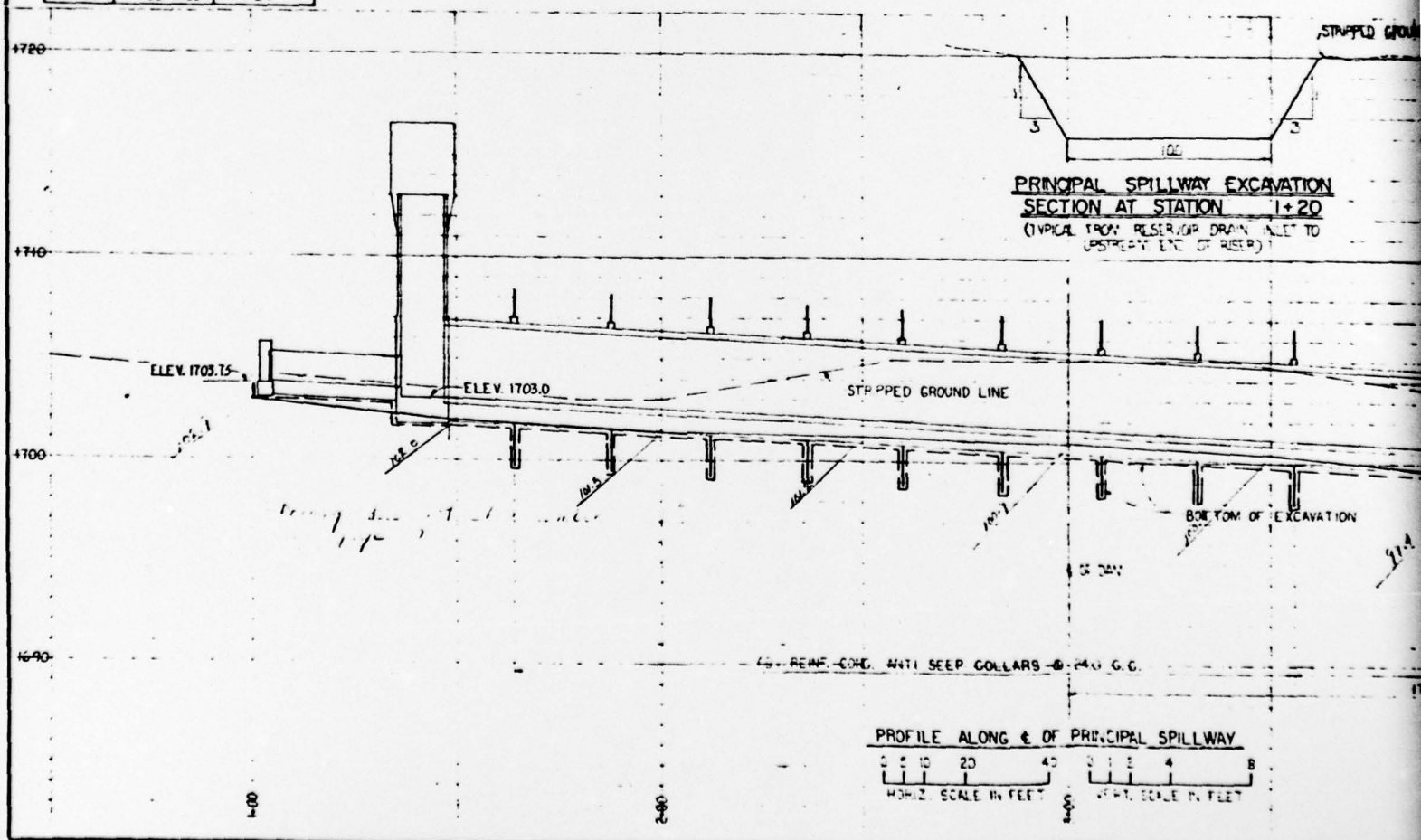
T = 123 91
E = 39 13
M = 31 99

℄ STATION	DEFLECTION Δ	CHORD DISTANCE
3+50	0	0
3+00	8° 11	49 8
2+50	16° 22	
2+00	24° 33	
1+50	32° 44	
1+35	35° 11' 30"	



DAM AND CURVE DATA LAYOUT

0 25 50 100 200
SCALE IN FEET

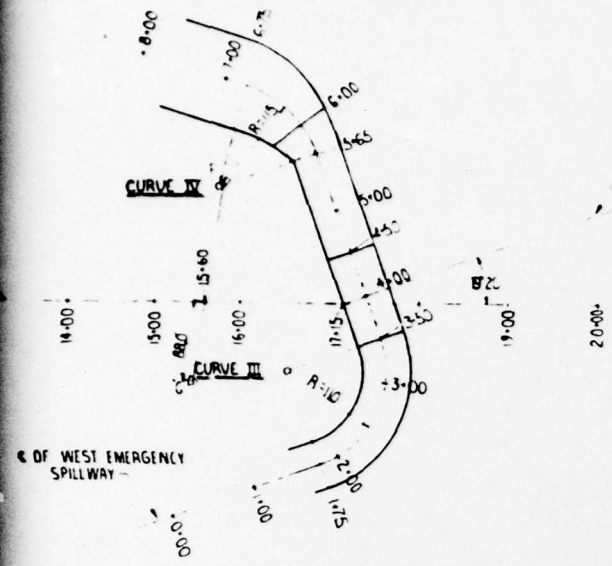


LAYOUT DATA CURVE IV

Δ = 54°48'
R = 115.0
D = 49°46'
L = 110.0

T = 59.6
E = 14.52
M = 12.9

℄ STATION	DEFLECTION Δ	CHORD DISTANCE
5+65	0	0
6+15	8°27'	49.8
6+65	24°55'	
6+75	27°24'	10.0

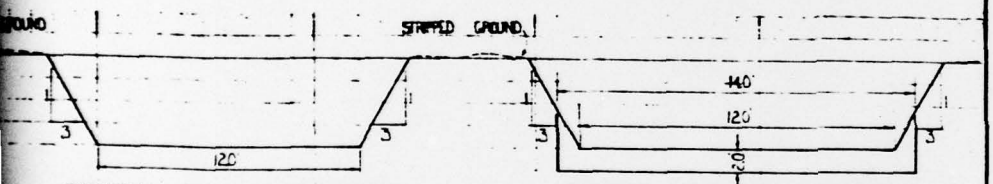


LAYOUT DATA CURVE III

Δ = 91°09'
R = 110.0
D = 52.52
L = 175.0

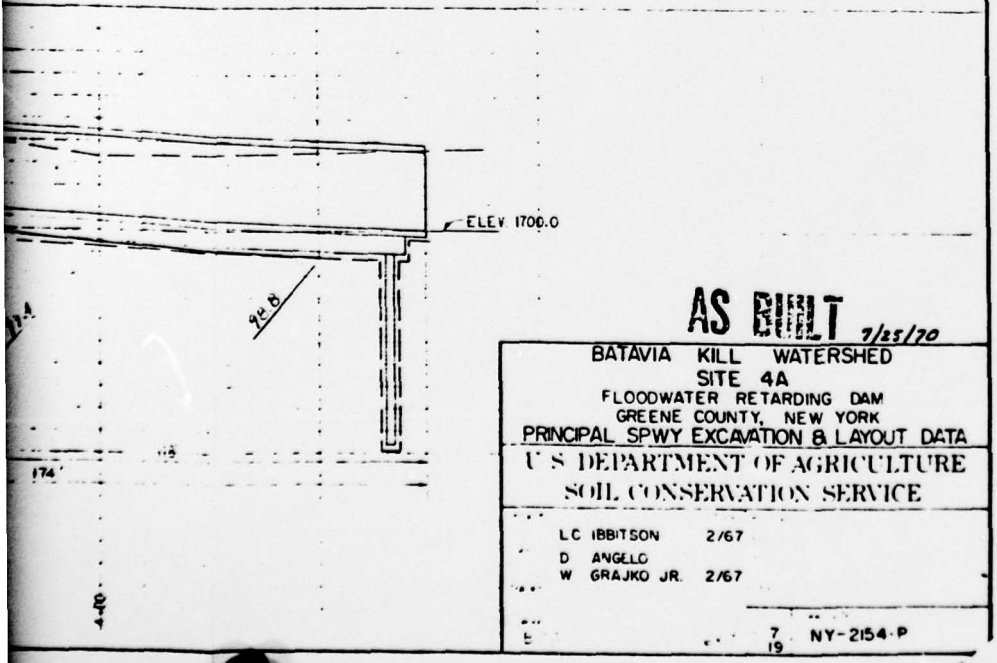
T = 112.23
E = 47.15
M = 33.00

℄ STATION	DEFLECTION Δ	CHORD DISTANCE
3+50	0	0
3+00	15°01'	49.8
2+50	26°03'	
2+00	39°04'	
1+75	45°35'	24.8



PRINCIPAL SPILLWAY EXCAVATION SECTION AT STATION 3+00
(TYPICAL FROM UPSTREAM END OF RISER TO DOWNSTREAM SLOPE OF DAM)

PRINCIPAL SPILLWAY EXCAVATION SECTION AT ANTI-SEEP COLLARS



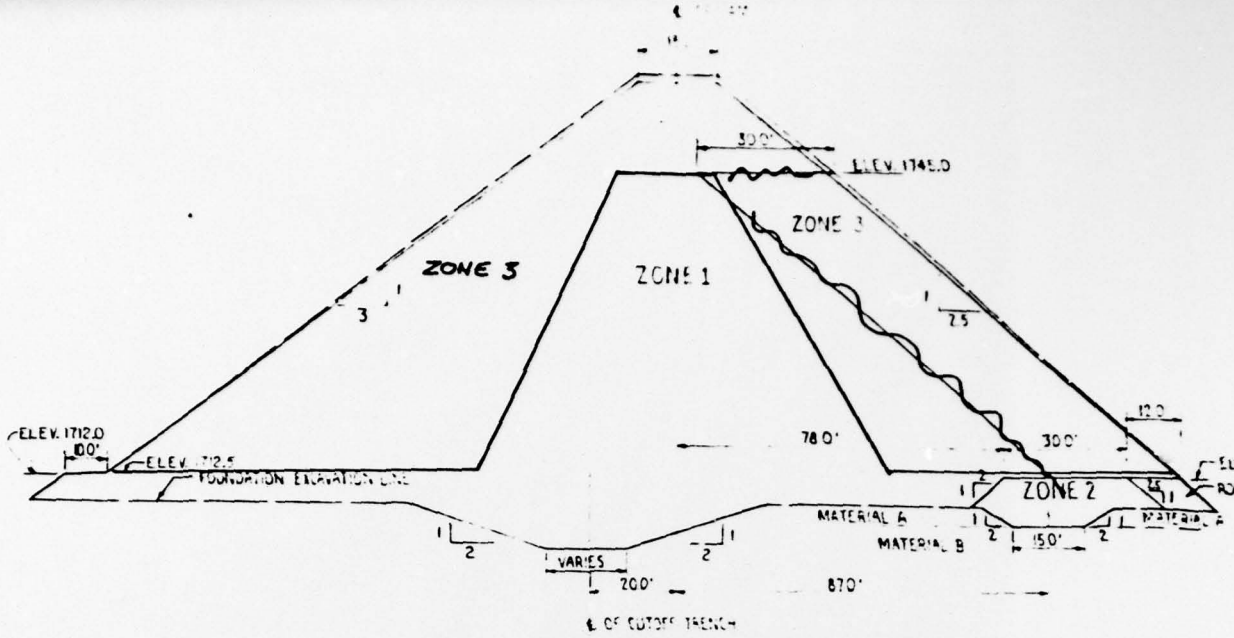
AS BUILT 7/25/70

BATAVIA KILL WATERSHED
SITE 4A
FLOODWATER RETARDING DAM
GREENE COUNTY, NEW YORK
PRINCIPAL SPWY EXCAVATION & LAYOUT DATA

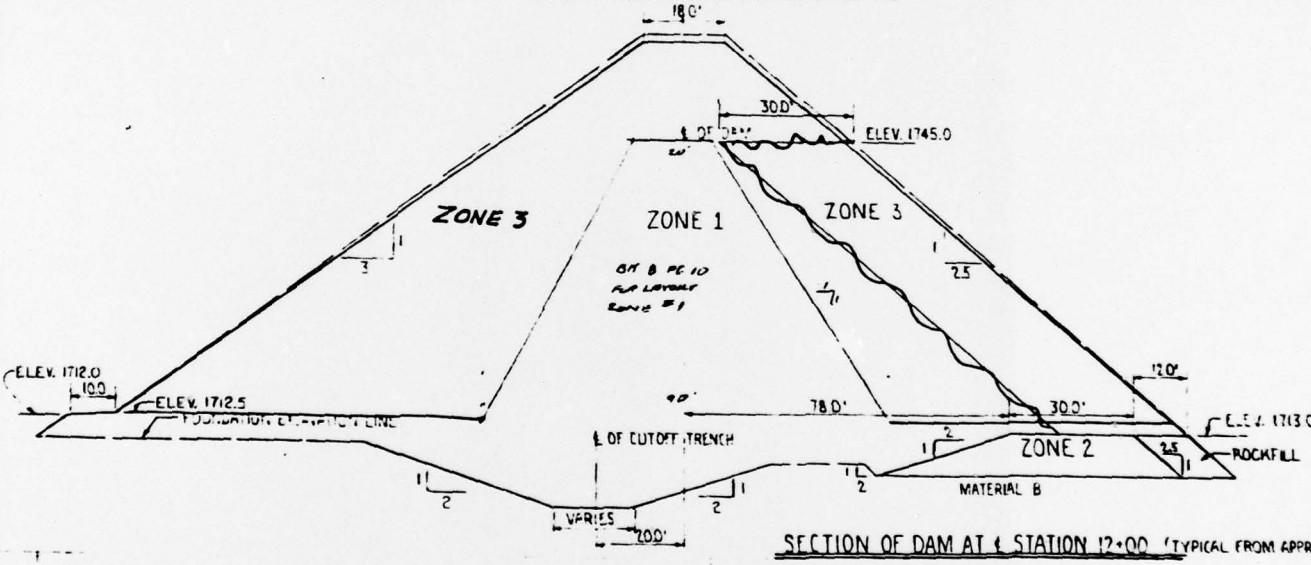
U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LC IBBITSON 2/67
D ANGELO
W GRAJKO JR. 2/67

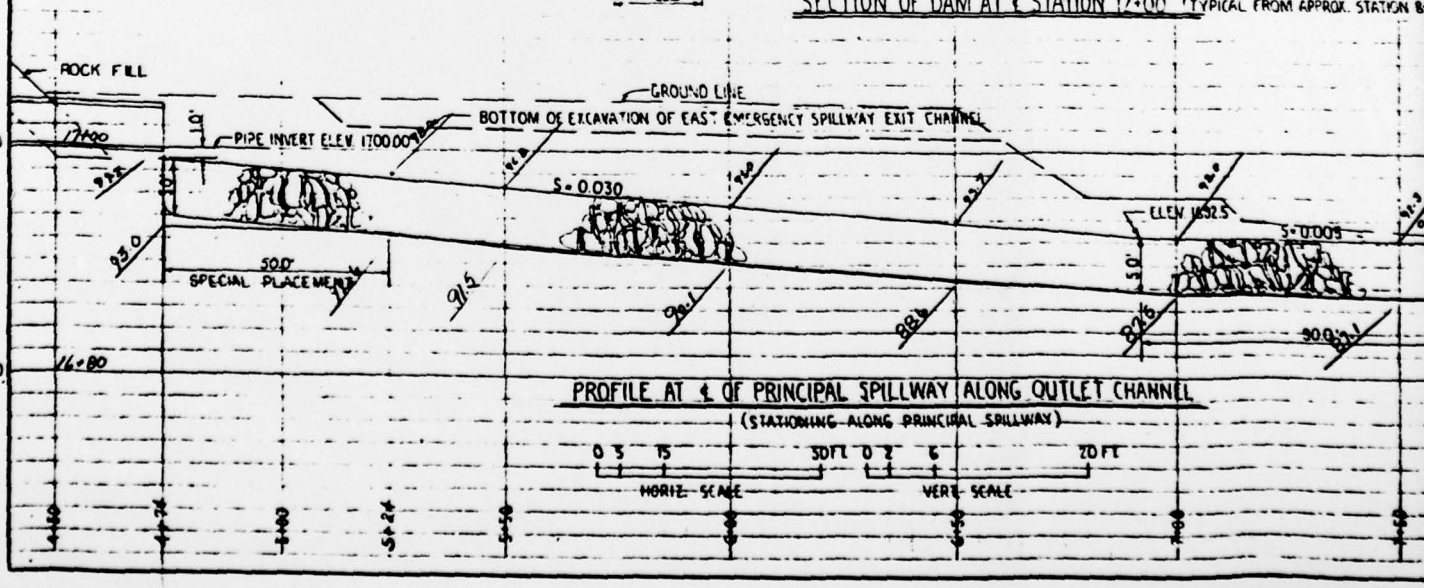
7
19 NY-2154-P



SECTION OF DAM AT ℄ STATION 7+00 (TYPICAL FROM APPROX. STATION 3+60 TO STATION 8+20)



SECTION OF DAM AT ℄ STATION 12+00 (TYPICAL FROM APPROX. STATION 8



PROFILE AT ℄ OF PRINCIPAL SPILLWAY ALONG OUTLET CHANNEL
(STATIONING ALONG PRINCIPAL SPILLWAY)

EARTH FILL REQUIREMENTS

MATERIAL 1/	MAX. LIFT 2/ SIZE 6/	MAX. SIZE 6/	REQ'D WATER CONTENT 3/	COMPACTION 4/ CLASS	COMPACTION 4/ DEFINITION
ERIAL A AS LABELLED ON SHEETS 17 AND 19 AND REPRESENTED BY: 04 FROM 1.0' TO 9.5' 05 FROM 0.5' TO 6.5' 35 FROM 1.0' TO 7.5' 58 FROM 0.5' TO 16.7' 02 FROM 0.5' TO 9.0'	6"	9"	2 PERCENTAGE POINTS BELOW / PERCENTAGE POINTS FROM OPTIMUM	A	95% MAXIMUM DENSITY BY ASTM D698 METHOD
ERIAL "B" AS LABELLED ON SHEETS 17, 18 AND 19 REPRESENTED BY: 0 FROM 1.0' TO 8.0' 6 FROM 1.0' TO 6.0' 7 FROM 3.0' TO 6.0'	6"	9"	WET	V	SEE SPEC. 5
L AS MATERIAL FOR ZONE 1 PLUS SULTED MATERIAL REMOVED FROM E 1	18	24	THE WATER CONTENT OF THE MATERIAL [illegible] % OF THE No. 4 SIEVE SHALL BE NOT LESS THAN 0 PERCENT NOR GREATER THAN 12 PERCENT.	V	SEE SPEC. 5
N FILL	30"	36	NATURAL	-	-

→ PASSING

1/ SEE SHEET 17, 18, AND 19 FOR DESCRIPTION AND LOCATION OF MATERIALS A THROUGH G.
2/ MAXIMUM LIFT THICKNESS PRIOR TO COMPACTION.
3/ WATER CONTENT AT TIME OF ~~PLACEMENT~~ COMPACTION
4/ FOR TYPICAL COMPACTION CURVES SEE SHT 19
5/ SEE SHEET 9 FOR STATIONING OF ZONE 2 FILL
6/ FILL ADJACENT TO STRUCTURE MAXIMUM SIZE ROCK 3" (HAND COMPACTED)

CONSTRUCTION DETAILS

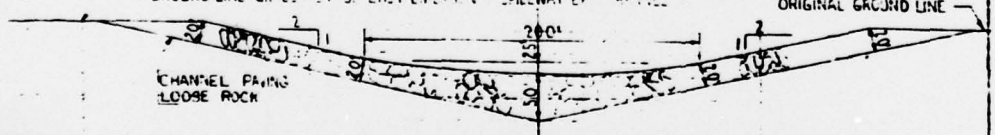
1 [illegible] AND TOP MATERIAL WITHIN THE LIMITS OF THE DAM WILL BE REMOVED (SPEC 4C)
2 FROM STA 3+06R TO ELEV 1150 (APPROX STA 3+50R), 2/ EXCAVATE INTO MATERIAL UNDER ZONE 2 FILL AND BACK FILL (SEE SECTION OF DAM AT ℄ STATION 1+00)
3 FROM STA 0+06L TO STA 1+50L 2/ EXCAVATE INTO MATERIAL UNDER ZONE 2 FILL (SEE SECTION OF DAM AT ℄ STATION 1+00, AND SECTION B-B SHEET 9)
4 FROM STA 1+50L TO ELEV 1150 (APPROX STA 2+10L) 2/ EXCAVATE TRENCH FOR ZONE 2 FILL 4 FEET BELOW THE STRIPPED GROUND LINE (SEE SECTION C-C SHEET 9)

AS BUILT

0+20 TO STATION 16+78

GROUND LINE OR BOTTOM OF EAST EMERGENCY SPILLWAY EXIT CHANNEL

ORIGINAL GROUND LINE



SECTION OF OUTLET CHANNEL AT STA. 6+00 (LOOKING DOWNSTR.
(TYPICAL FROM ℄ STATION 4+74 TO APPROX. STATION 7+82)

ORIGINAL CHANNEL BOTTOM

8+24

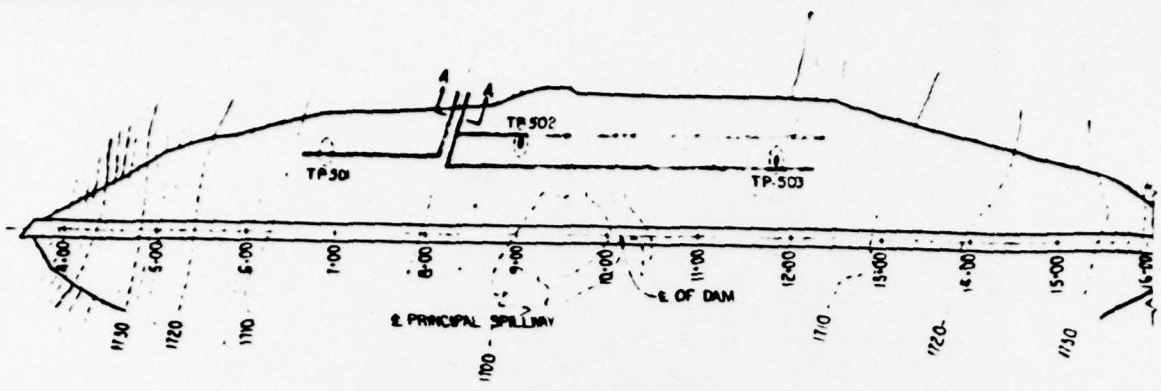
6+00

9/25/70

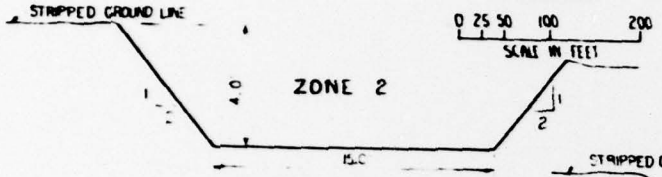
BATAVIA KILL WATERSHED
SITE 4A
FLOODWATER RETARDING DAM
GREENE COUNTY, NEW YORK
FILL PLACEMENT & OUTLET CHANNEL
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed	Date	Approved by
L C IBBITSON	4/67	Title
Drawn B FELTON W YOLTON	4/67	Title
Traced		
Checked	4/67	Sheet No. 8 of 19 — Drawing No. NY-2154-P

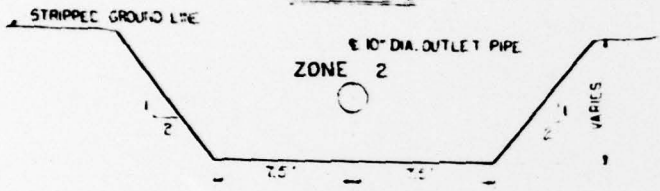
2



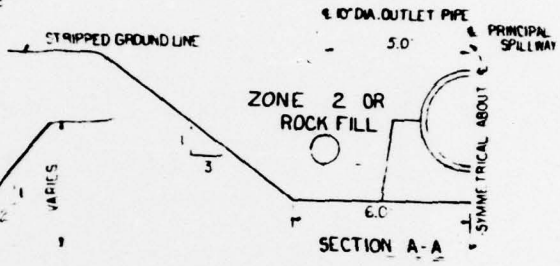
PLAN VIEW



SECTION C-C



SECTION B-B



SECTION A-A

CONSTRUCTION DETAILS

1. ALL DRAIN PIPE SHALL CONFORM TO [illegible] AND SHALL BE [illegible] (ANNULAR CORRUGATIONS) OR CLASS [illegible] (HELICAL CORRUGATIONS) TYPE A [illegible] BITUMINOUS COATED) PIPE.
2. SEE FILL PLACEMENT SHEET 4 FOR [illegible] AND ROCK FILL DETAILS.
3. THE PROFILES AT THE BOTTOM OF [illegible] TIONS AS SHOWN ARE ONLY APPROXIMATE. THE REQUIRED FINISHED GRADES ARE TO BE ESTABLISHED IN THE FIELD AT THE TIME OF CONSTRUCTION BY THE ENGINEER.

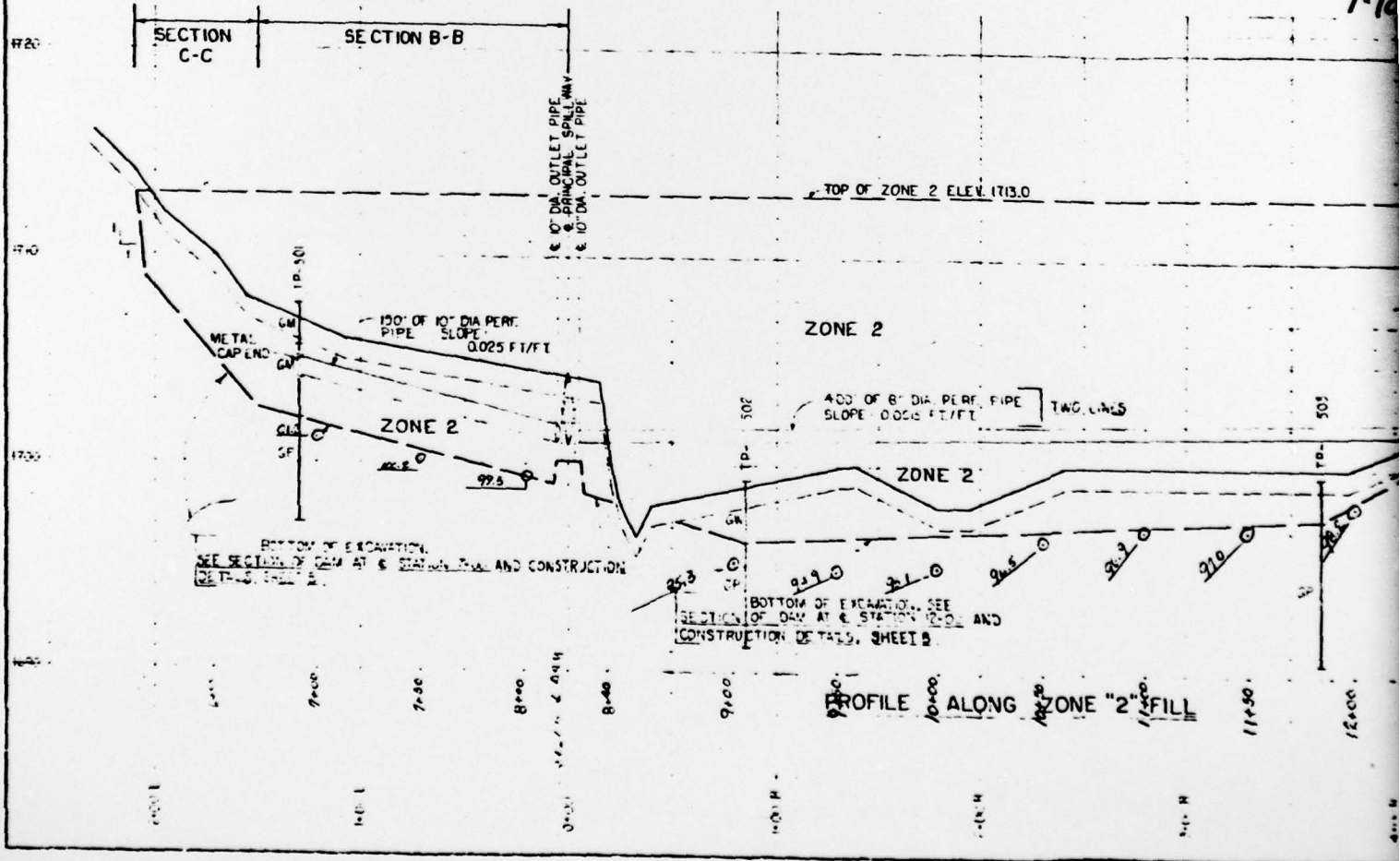
QUANTITIES

[illegible] FT. OF 4" DIA. PERF. PIPE SECTIONS
[illegible] FT. OF 10" DIA. PERF. PIPE SECTIONS
(2) 30 FT. SECTIONS OF 10" DIA. [illegible]
(1) 75' 10" DIA. LATERAL WITH 4" DIA. [illegible]
(1) 79 10" DIA. ELBOW
(1) 109 10" DIA. ELBOW
(1) 4"-10" DIA. REDUCER SECTION
(3) METAL END CAPS
(2) SMALL ANIMAL GUARDS

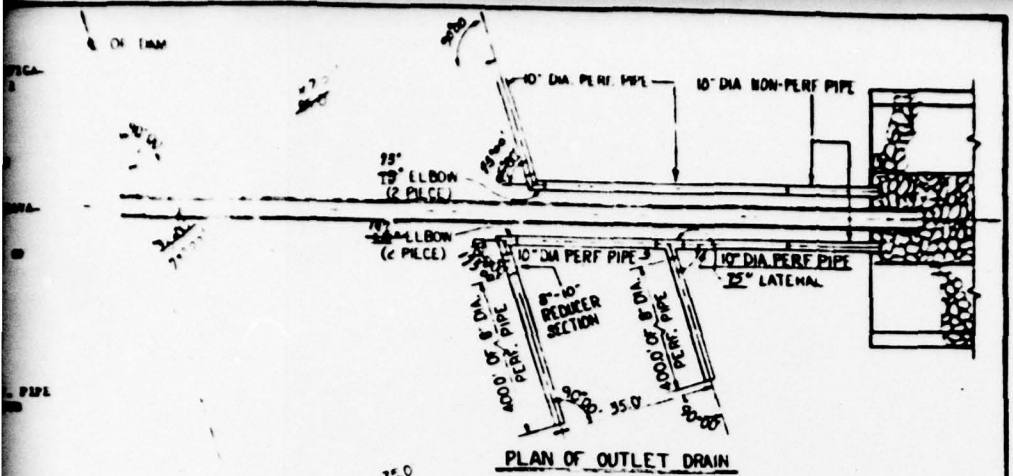
INVERT ELEV. 1701.35

56.0 OF 10" DIA PERF PIPE

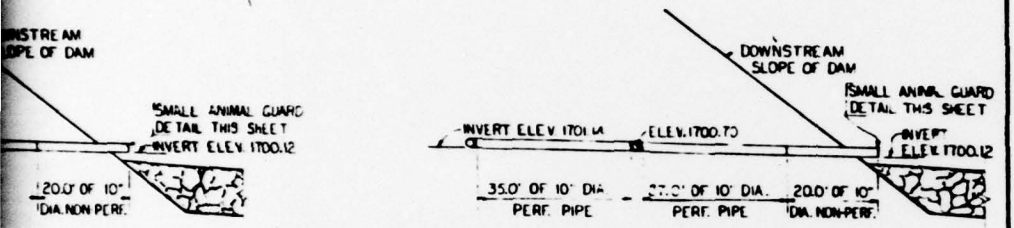
PROFILE ALONG LEFT



PROFILE ALONG ZONE "2" FILL

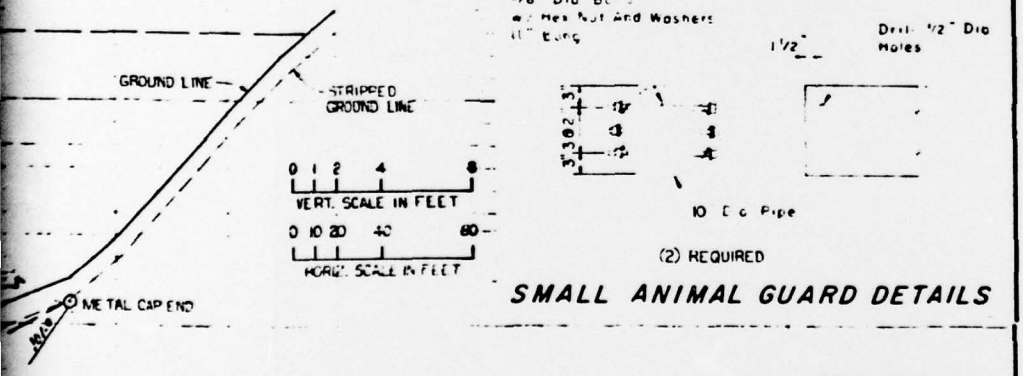


PLAN OF OUTLET DRAIN



OUTLET DRAIN NOT TO SCALE PROFILE ALONG RIGHT OUTLET DRAIN

DITICATION – DRAIN SYSTEM SEE SHEET 9A



SMALL ANIMAL GUARD DETAILS

AS BUILT 7/25/70

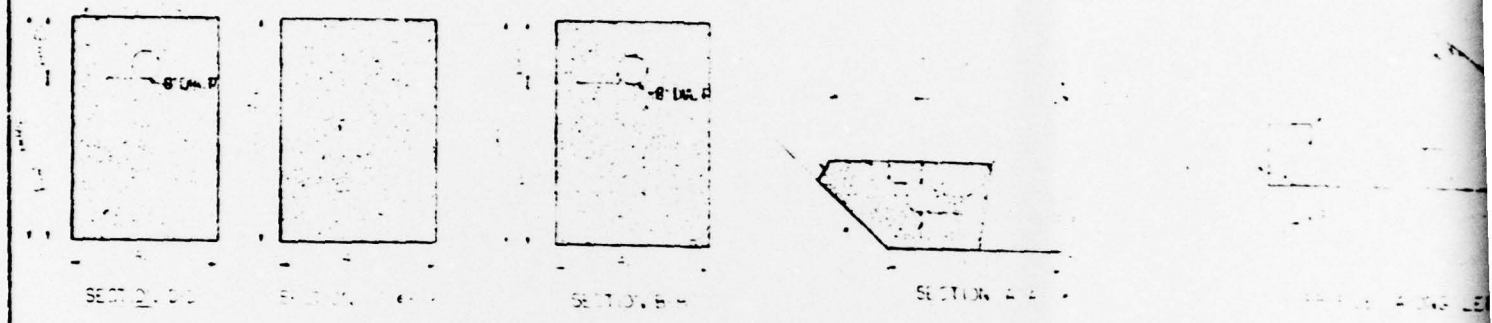
BATAVIA KILL WATERSHED
SITE 4A
FLOODWATER RETARDING DAM
GREENE COUNTY, NEW YORK
DRAINAGE SYSTEM DETAILS

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

L C IBBITSON	4/67
D ANGELO	4/67

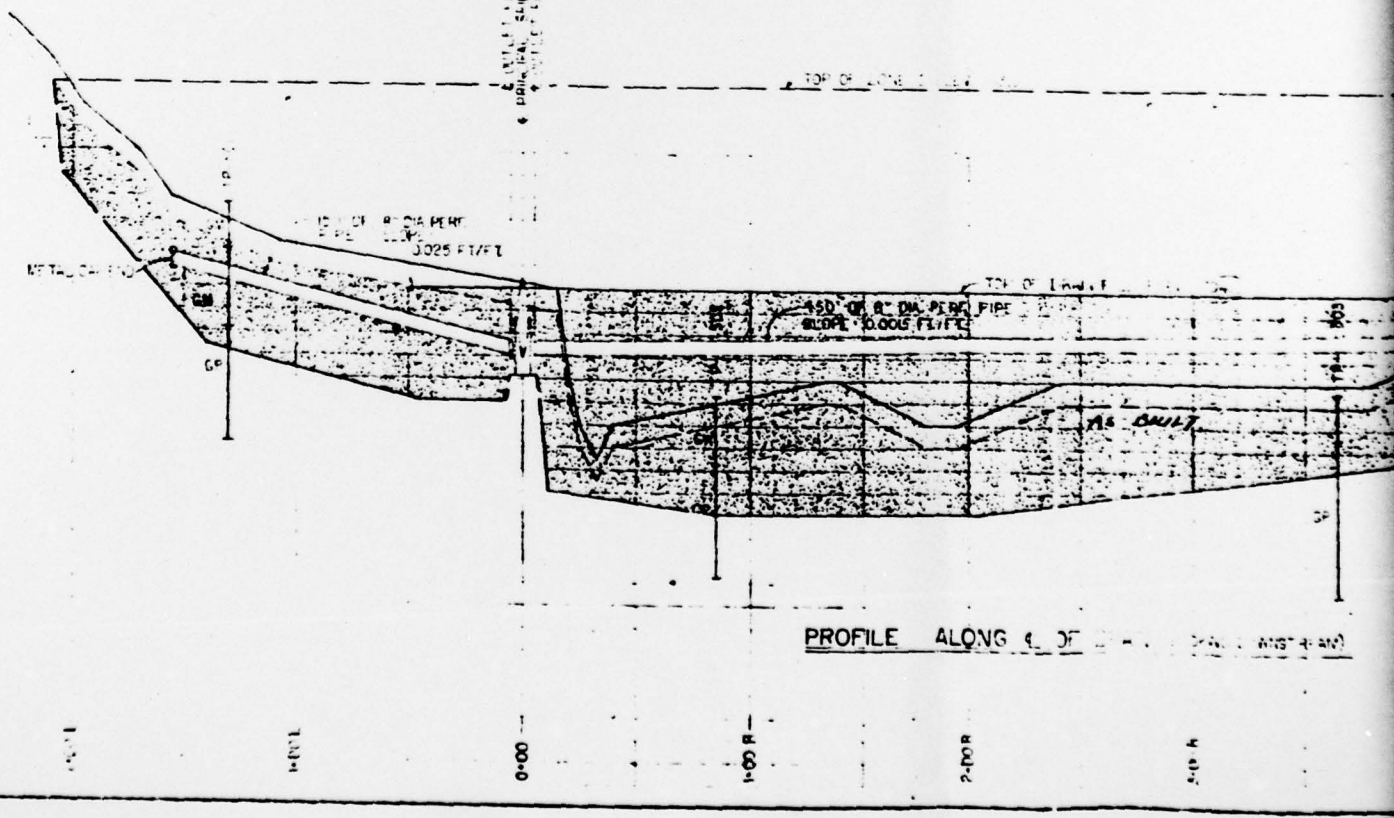
NY-2154-P

18+50

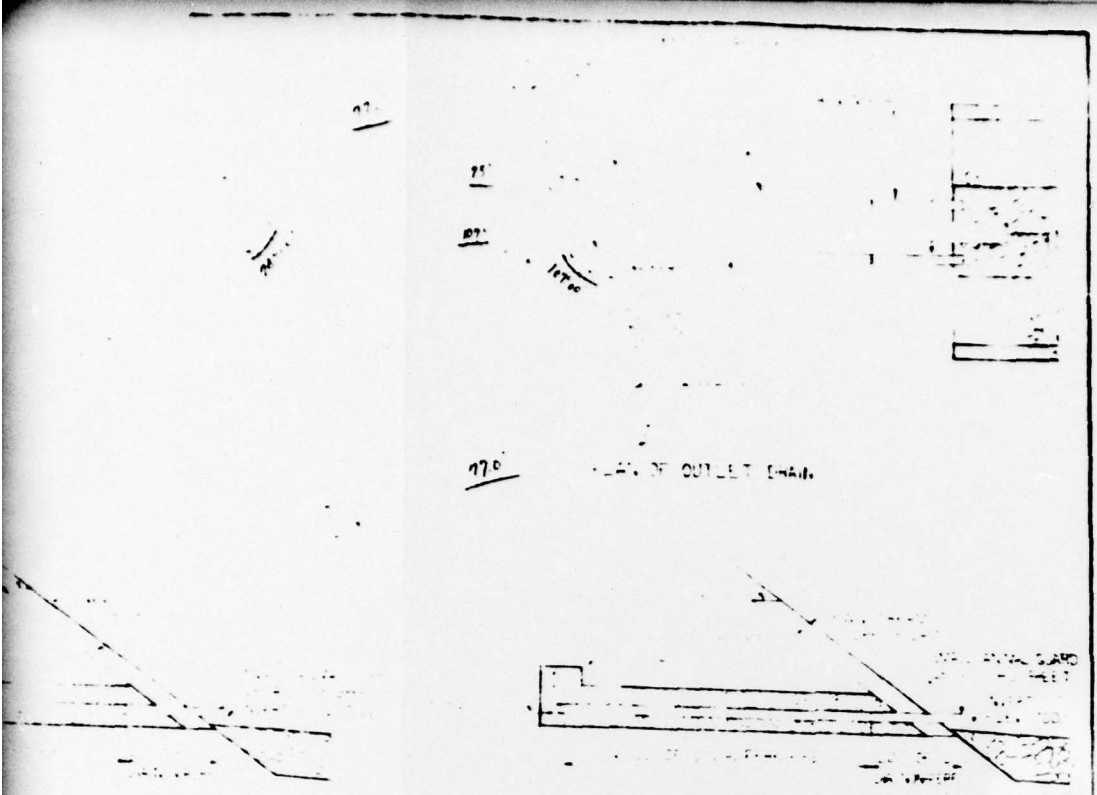


SECTION C-C

SECTION B-B



PROFILE ALONG ℄ OF



LEFT OUTLET DRAIN

PROFILE ALONG RIGHT OUTLET DRAIN

2" REQUIRED

SMALL ANIMAL GUARD DETAILS

7/25/70 **AS BUILT**

BATAVIA KILL WATERSHED
SITE 4A
FLOODWATER RETARDING DAM
GREENE COUNTY, NEW YORK
DRAINAGE SYSTEM DETAILS

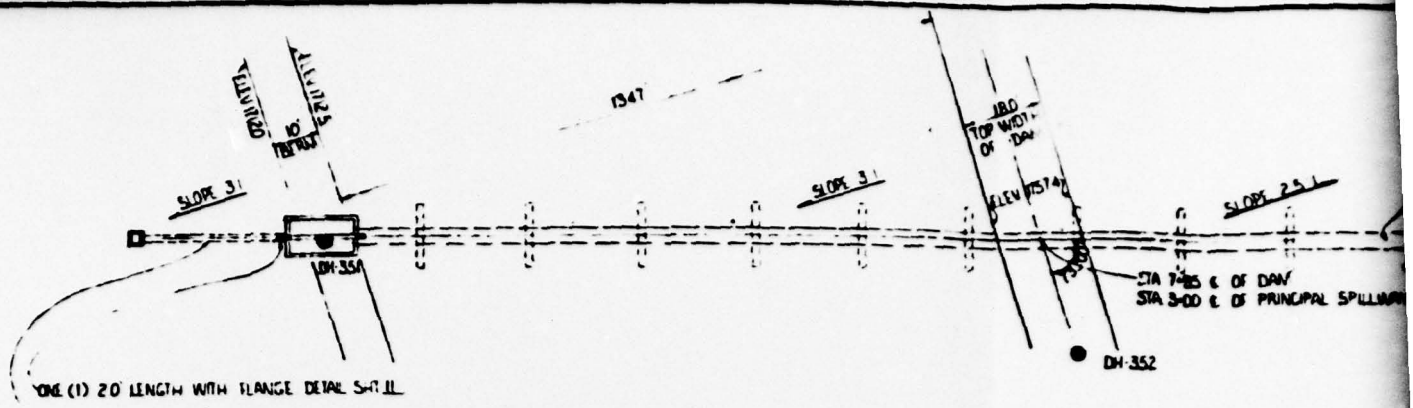
DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SECTION 11/68

DESIGNED 11/68

NY-2154-P

2



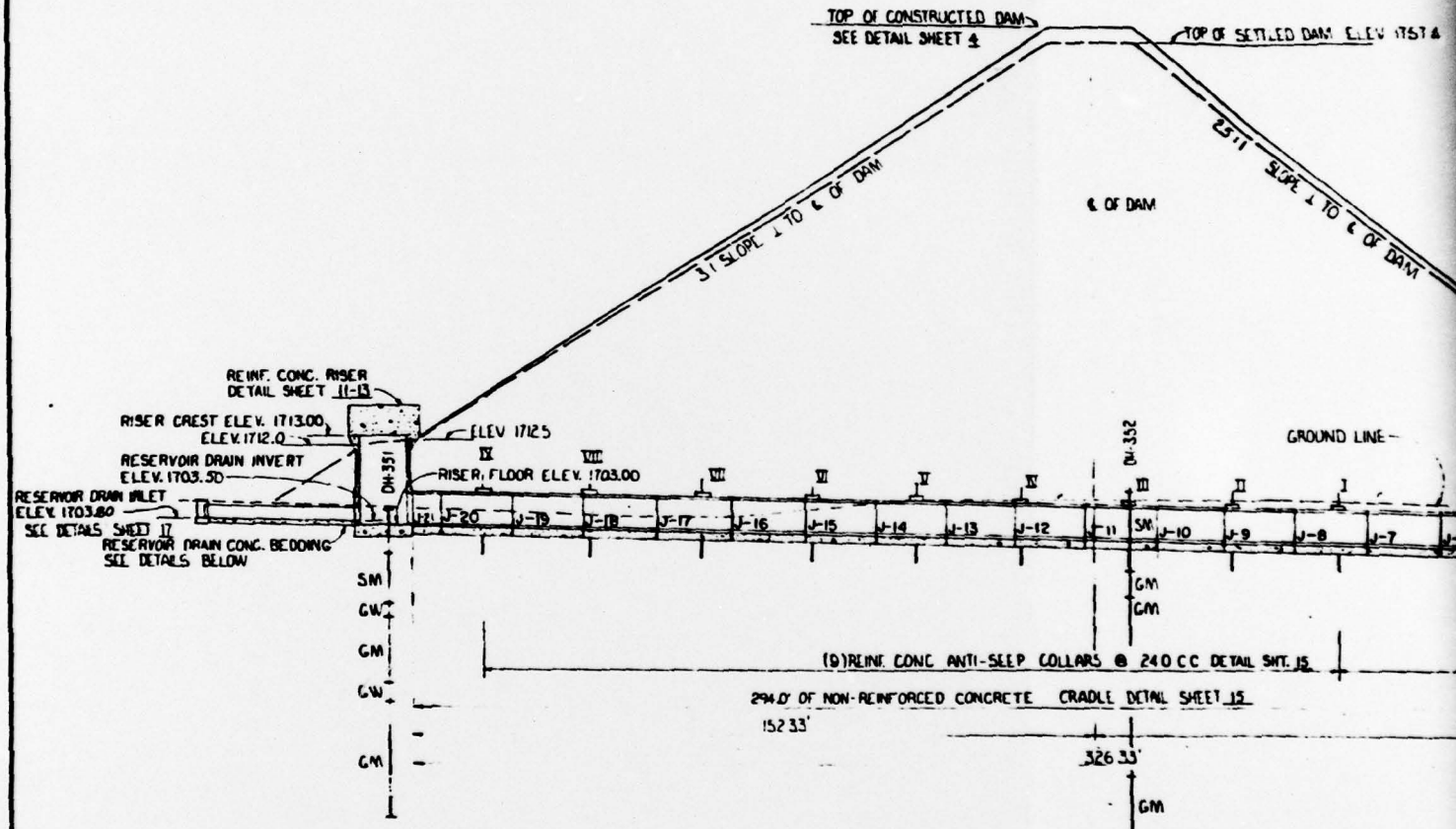
ONE (1) 20' LENGTH WITH FLANGE DETAIL SHT 11

300' OF STRAIGHT PIPE (CAST IRON)

NOTE: USE STANDARD MECHANICAL JOINTS
PIPE SHALL CONFORM TO SPEC 300
AND SHALL BE 18 NOMINAL DIA
THICKNESS CLASS I

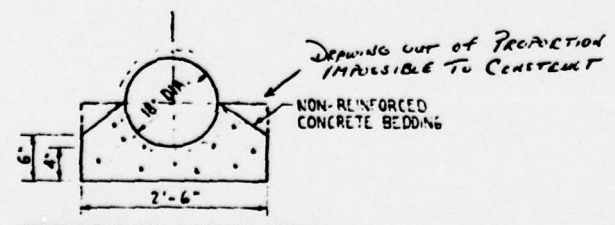
PLAN VIEW

0 5 ℄ 20 40
SCALE IN FT



PROFILE ALONG ℄ OF PRINCIPAL SPILLWAY

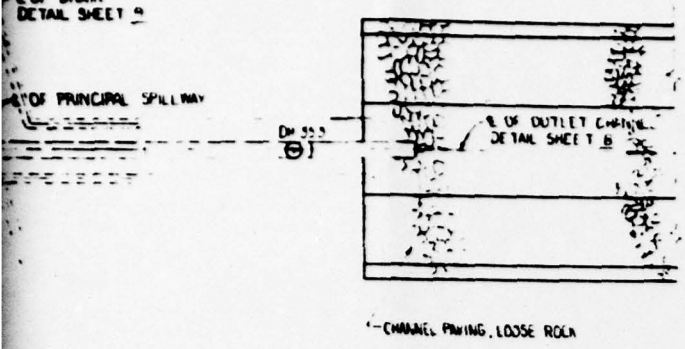
0 5 10 20 0 5 ℄ 25 40
VERT SCALE IN FT HORZ SCALE IN FT



RESERVOIR DRAIN CONCRETE BEDDING

(20) 160' SECT
(1) 60' SECT
1 SPIGOT R
FITTING

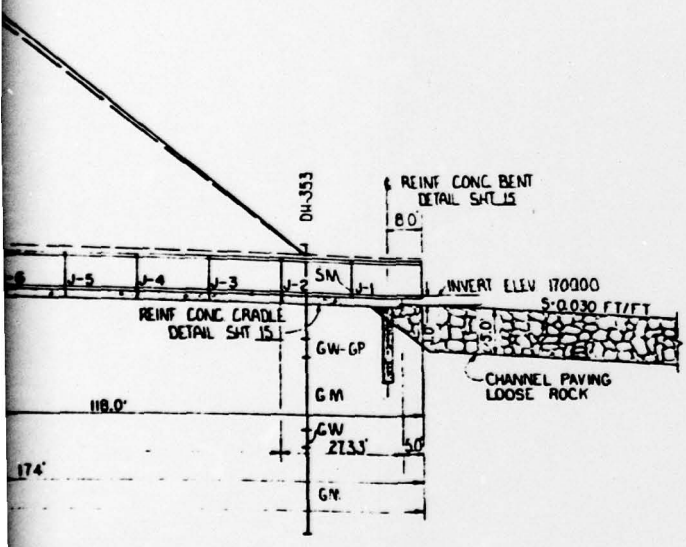
PIPE SUPPLIER
CAST OUTSIDE
CONCRETE ON



JOINT	DIST FROM OUTLET	INVERT OF 42" DIA PIPE	SLOPE
OUTLET	0	1700.00	
J-1	16	1700.19	
J-2	32	1700.38	
J-3	48	1700.58	
J-4	64	1700.77	
J-5	80	1700.96	
J-6	96	1701.16	
J-7	112	1701.35	
J-8	128	1701.54	
J-9	144	1701.73	
J-10	160	1701.93	
J-11	176	1702.12	S=0.01204
J-12	182	1702.21	
J-13	208	1702.31	
J-14	224	1702.40	
J-15	240	1702.50	
J-16	256	1702.59	
J-17	272	1702.68	
J-18	288	1702.78	
J-19	304	1702.87	S=0.00598
J-20	320	1702.96	
J-21	326	1703.00	

NOTE ABOVE DIMENSIONS FOR LENGTHS OF PIPE ARE BASED ON NOMINAL LENGTHS AND DO NOT INCLUDE CREEP

COLLAR	DIST FROM OUTLET	INVERT OF 42" DIA PIPE
I	118	1701.42
II	142	1701.71
III	166	1702.00
IV	190	1702.20
V	214	1702.34
VI	238	1702.48
VII	262	1702.62
VIII	286	1702.76
IX	310	1702.91



42" REINFORCED CONCRETE PIPE STRENGTH REQUIREMENTS

1 PRESSURE HEAD = 50 FT
2 LOAD 67,602 LBS PER LIN FT BASED ON CD OF 4.23'
3 MIN 3 EDGE BEARING STRENGTH FOR 0.01" CRACK = 17,805 LBS PER LIN FT FOR PRESTRESSED PIPE (AWWA C-301)

NOTE WHEN PIPE IS SUPPLIED IN 20.0' LENGTHS THE ENGINEER WILL PROVIDE THE CONTRACTOR WITH A REVISION OF SHEET 10 SHOWING ORDER OF INSTALLATION AND PIPE INVERT ELEVATIONS.

AS BUILT

7/25/70

FABRICATION INSTRUCTIONS

...IONS
...TION
...NG WALL
...E 2' AA

OR

(16) 20.0' SECTIONS
(1) 6.0' SECTION
1 SPIGOT RING WELL
FITTING FOR 2' WALL

...S NOTE:
...E SPIGOT RING WITH
...ONE 6.0' SECTION.

PIPE SUPPLIERS NOTE
CAST OUTSIDE OF SPIGOT RING WITH CONCRETE ON ONE 20.0' SECTION

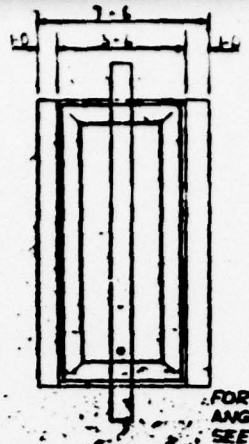
BATAVIA KILL WATERSHED
SITE 4A
FLOODWATER RETARDING DAM
GREENE COUNTY NEW YORK
PLAN PROFILE OF PRINCIPAL SPILLWAY

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

		Date		
...:	L. IBBITSON	4/67	Approved by	
...	B. FELTON	4/67	Title	
Title			Date	
...	B. J. G	4/67	Sheet No. 10 of 19 sheets	NY-2154-P

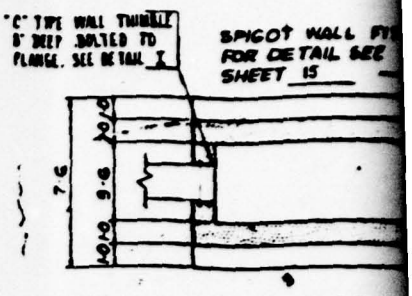
...1 11 (APRIL 1963)

2



FOR DETAIL OF TRASHRACK ANGLES AND GRATING SEE SHEET 14

TOP PLAN



SECTION A-A

1/4" x 6" Steel Plate, Grade B or C Continuous Thru Constr. Joint. Splices Shall Be Either:
1. Butt Welded
2. Lapped 3" And Bolted
3. Lapped 3" And Fillet Welded

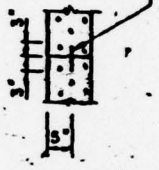
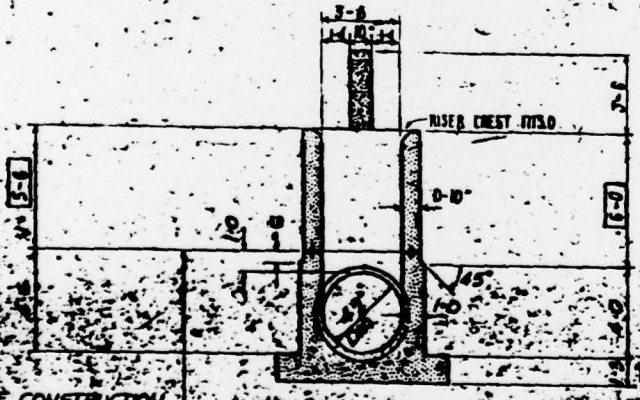
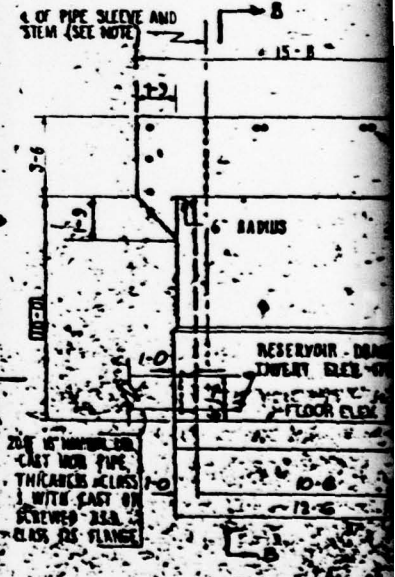


PLATE CONSTR JOINT



SECTION B-B



SIDEWALL ELEV

SCALE IN FEET

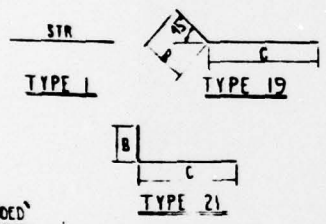
NOTE: 1. BLOCKED IN DIMENSIONS NOT TO SCALE.
2. ALL RISER STRUCTURAL DETAIL DIMENSIONS SHOWN IN FEET AND INCHES.

STEEL SCHEDULE

MARK	SIZE	QUANTITY	LENGTH	TYPE	B	C	TOTAL LENGTH
B1	5	17	7-0	1	-	-	119-0
B2	5	9	12-0	1	-	-	108-0
B3	7	44	8-6	21	3-8	4-10	374-0
B4	5	9	12-0	1	-	-	108-0
B5	5	15	7-0	1	-	-	105-0
B6	5	2	2-10	1	-	-	5-8
B7	6	4	5-9	21	1-0	4-9	23-0
B8	5	4	7-10	21	1-0	6-10	31-4
B9	6	14	7-10	21	1-0	6-10	109-8
B10	6	2	5-9	21	1-0	4-9	11-6
B11	7	10	11-2	1	-	-	111-8
B12	6	4	4-2	1	-	-	16-8
B13	5	16	10-4	21	3-5	6-11	166-4
B14	5	4	8-0	21	1-1	6-11	32-0
B15	5	4	7-8	21	0-9	6-11	30-8
B16	5	6	7-5	21	0-6	6-11	44-6
B17	5	2	9-0	21	2-1	6-11	18-0
B18	6	4	10-4	21	3-5	6-11	41-4
B19	7	44	4-4	1	-	-	190-8
B20	6	4	4-0	1	-	-	16-0
B21	6	2	4-0	1	-	-	8-0
B22	6	2	2-5	1	-	-	4-10
B23	6	2	2-6	1	-	-	5-0
B24	6	8	2-6	1	-	-	20-0

MARK	SIZE	QUANTITY	LENGTH	TYPE	B	C	TOTAL LENGTH
R1	5	18	5-3	1	—	—	94-6
R2	5	6	5-3	1	—	—	31-6
R3	5	20	5-3	1	—	—	105-0
R4	5	8	5-3	1	—	—	42-0
R5	7	14	11-2	1	—	—	156-8
R6	5	12	4-2	1	—	—	50-0
R7	6	44	10-4	21	3-5	6-11	456-7
T1	5	4	4-8	21	1-7	3-1	18-8
T2	5	4	1-6	21	—	—	6-0
T3	5	8	15-2	21	—	—	121-8
T4	5	4	3-3	21	—	—	13-0
T5	5	4	4-3	21	—	—	17-0
T6	5	2	3-3	1	—	—	6-6
T7	5	20	3-0	1	—	—	60-0

BAR TYPES

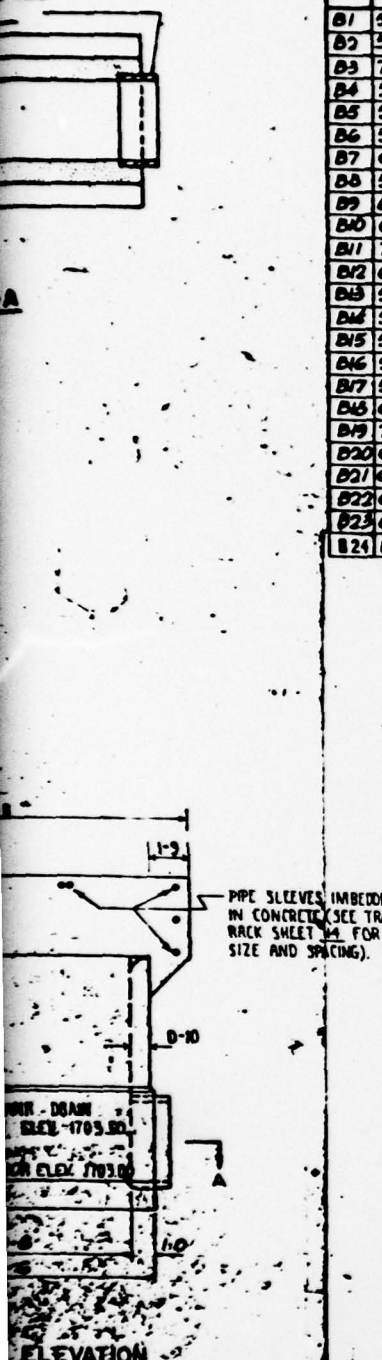


CONSTRUCTION DETAILS

1. SPECIFIED BAR DIMENSIONS ARE MEASURED TO THE OUTSIDE EDGE OF ALL BENDS
2. RADIUS OF BENDS EQUALS 3 BAR DIAMETERS FOR SIZES EQUAL TO OR LESS THAN #7
3. THE 2"Ø3" DISTANCE FROM THE SPECIFIED CONCRETE SURFACES ARE CLEAR DISTANCES. WHERE NOT SPECIFIED, ALL REINFORCING STEEL PLACED IN CONCRETE POURED AGAINST THE GROUND SHALL HAVE A MINIMUM OF 3" COVER. ALL REINFORCING STEEL PLACED IN CONCRETE POURED IN FORMS SHALL HAVE A MINIMUM OF 2" CLEAR COVER.
4. ALL EXPOSED EDGE OF CONCRETE TO HAVE A ¾" CHAMFER UNLESS OTHERWISE NOTED

SLIDE GATE DETAILS

1. 18" DIA FLAT FRAME SLIDE GATE (SELF CONTAINED UNIT.)
2. CLASS D-11
3. SLIDE GATE SHALL CONFORM TO SPEC. 301 AND SHALL BE TYPE MHS-1
4. "C" TYPE WALL THIMBLE 8" DEEP
5. PIPE SLEEVE, STEM, & STEM GUIDES SIZED AND SPACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. REMOVABLE T-HANDLE WRENCH, WRENCH SOCKET AND TOP OF STEM LOCATED WITHIN PIPE SLEEVE.
6. PAINT IN ACCORDANCE WITH SPEC 22.
7. HOLES DRILLED IN BACK FLANGE OF WALL THIMBLE BY GATE MANUFACTURER ACCORDING TO A.S.A. CLASS 125 FLANGE SPECIFICATIONS
   - DIA OF BOLT CIRCLE - 25"
   - NUMBER OF BOLT HOLES - 20
   - DIA OF BOLT HOLES - 1¼"



AS BUILT 7/25/78

RISER QUANTITIES

STEEL

#5 BARS	1347-6	1405	LBS
#6 BARS	710-7	1067	LBS
#7 BARS	852-8	1702	LBS
TOTAL =		4174	LBS

CONCRETE (REINFORCED) 16.0 CU. YDS.

BATAVIA KILL WATERSHED
SITE 4A
FLOODWATER RETARDING DAM
GREENE COUNTY, NEW YORK
RISER STRUCTURAL DETAILS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

J. C. IBBITSON 2467	
O. W. LAKE 2467	

2

RESERVOIR DRAIN TRASH RACK BILL OF MATERIALS

ITEM	SIZE	LENGTH	QUANTITY
		2'-5½"	2
		2'-0"	4
		2'-5½"	4
		3'-3"	6
		2'-4"	2
		2'-6"	4
		2'-8"	6

RESERVOIR DRAIN STEEL SCHEDULE

MARK	QUAN	SIZE	LENGTH	TYPE	TOTAL LENGTH
				T	20'6"

BAR TYPES

① _____

RESERVOIR DRAIN INLET QUANTITIES

STEEL

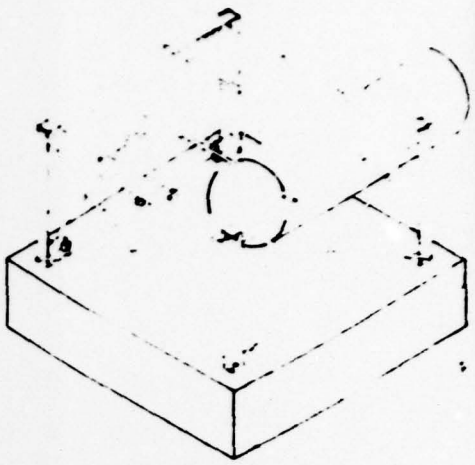
No 4 Bar 20.67 Lin Ft 13.8 Lbs

CONCRETE

Reinforced 0.3 Cu Yds

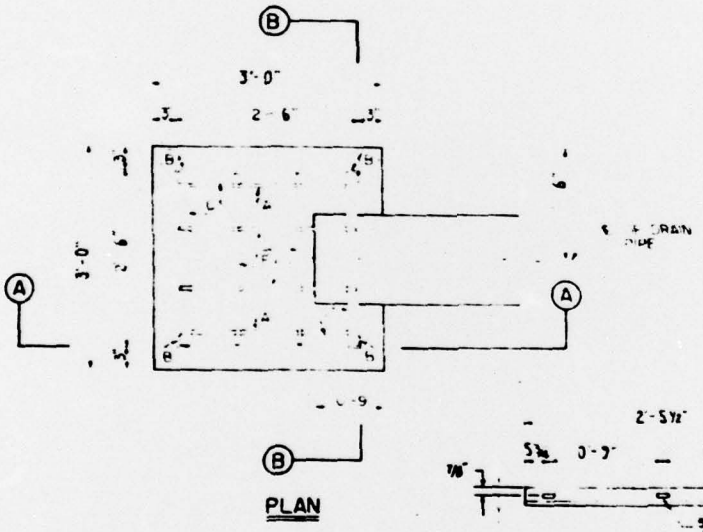
CONSTRUCTION DETAILS

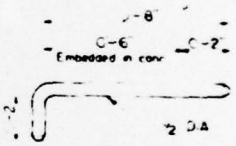
1. All points of contact between angles and between reinforcing bars and angles to be welded
2. Material in trash rack shall conform to Spec 117 for structural carbon steel plates, shapes and bars
3. Trash rack shall be painted in accordance with Spec 22



ISOMETRIC

NOT TO SCALE





ANCHOR BOLT DETAIL

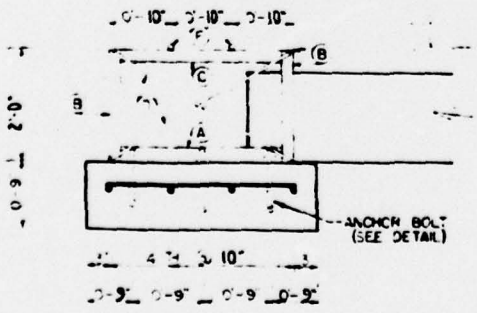
NOT TO SCALE

GALVANIZED

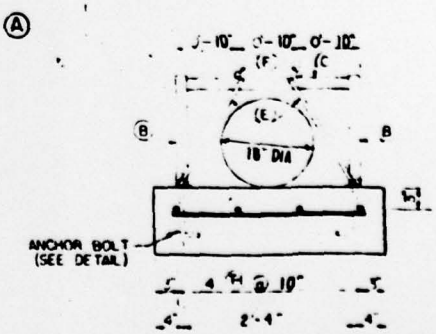
Supply with Hex Nut and Washer

ANGLE IRON (A)

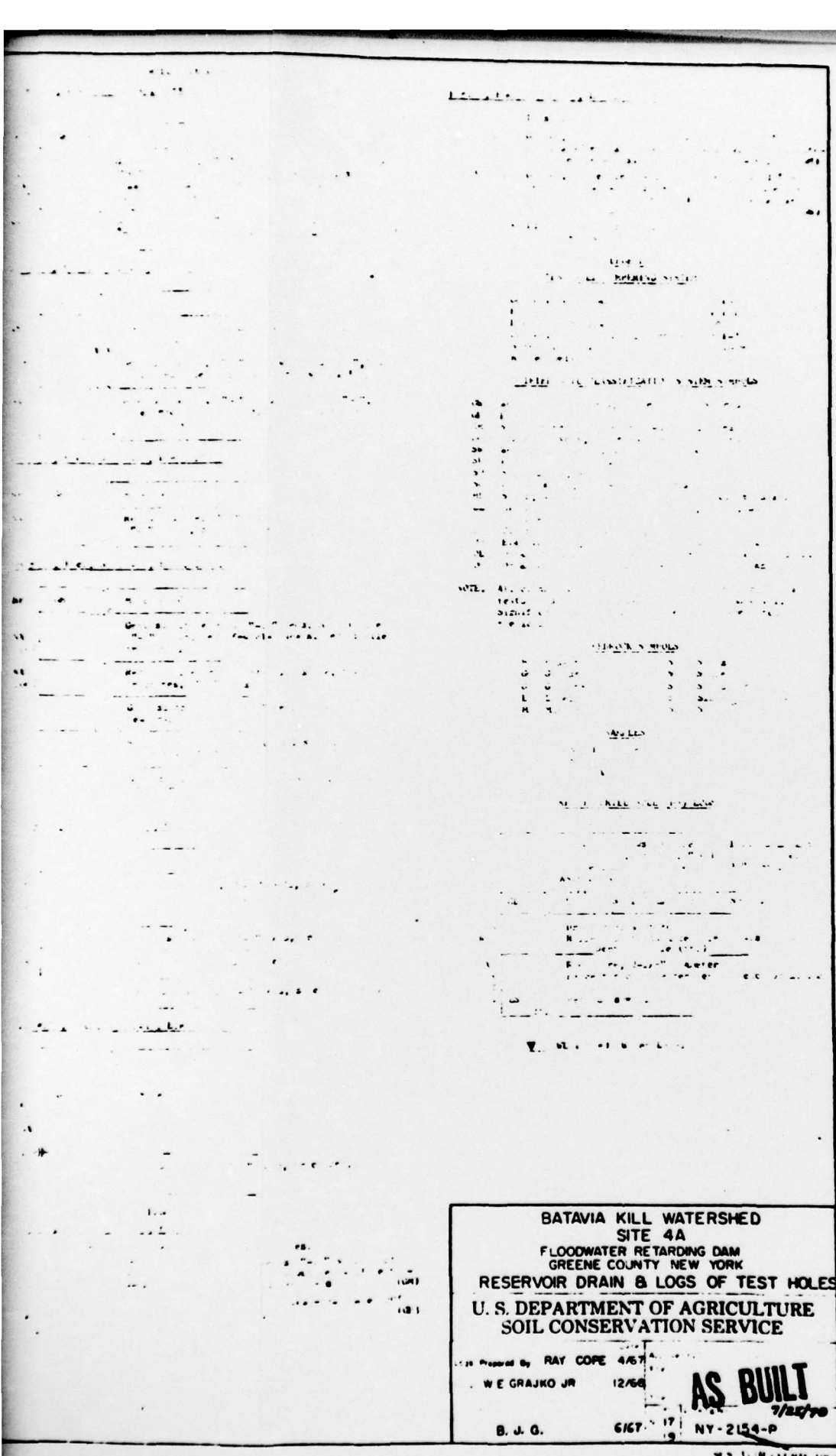
NOT TO SCALE



SECTION A-A



SECTION B-B



BATAVIA KILL WATERSHED
SITE 4A
FLOODWATER RETARDING DAM
GREENE COUNTY NEW YORK
RESERVOIR DRAIN & LOGS OF TEST HOLES

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Drawing Prepared By RAY COPE 4/67
W E GRAJKO JR 12/66

AS BUILT 7/25/70

B. J. G. 6/67 17 NY-2154-P

2